STEEL

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As the Editor Views the News

WHEN President Roosevelt, on the eve of his departure from Washington, issued an executive order permitting bidders to slash code prices on government and other public work, he delivered a load of dynamite to the vacation administrative staff. It will take almost a miracle to prevent the sparks of discord or misunderstanding from setting it off before he returns. The order, pertaining to government and public purchases, reads:

> "Any bidder complies with the code of his industry if he quotes a price not more than 15 per cent below the price filed with his code authority; this government price to be secret until bids are opened, after which he must file this price with the code authority in order that consumers can benefit from the lower price."

• • •

New Order Is Confusing

It has been explained that the President's action in casting the United States government in the role of No. 1 chiseler was prompted by a desire to provide a price incentive for the administration's housing program. Nevertheless, the first effect is to confuse code members in many important industries. Code authorities may ask exemption from the executive order on the ground that their code constitutes a contract not to be abrogated except by mutual consent. Wise interpretation by Washington and cool headed restraint by industrial leaders will be required to head off a return to destructive price warfare.

• • •

Price Policy Change Abrupt

While the majority in industry may agree that the times call for lower rather than higher prices, the action of the government in reversing its policy so quickly will be resented. The change from strong price maintenance to tacit price depression came too abruptly to permit orderly adjustment. Sellers were placed in the embarrassing spot of having to renege on published quotations. Consumers, threatened with the higher prices filed, stocked up at old levels and now see that their forehandedness was futile. These and other experiences of industry traceable to artificial rulings involved in industry's "cooperation" with the government under NRA tend to show the difficulties of partial regulation. Nevertheless, the existing system seems to be the only alternative to iron-clad regimentation on one hand, or old fashioned competition on the other.

• • •

Progress in Two Directions

Two recent meetings yielded an abundance of new information on the making and performance of steel. At Pittsburgh, open-hearth operators listened (p. 38) to statements of important efficiencies obtained through the use of Moll checkers and of fuel economies resulting from furnace insulation. At Atlantic City, before the annual meeting of the American Society for Testing Materials, an oil company metallurgist (p. 30) reported on a study of four years' experience with 670 tons of 4 to 6 per cent chromium steel still tubes. His remarks raise interesting conjecture regarding the brittleness of material for this exacting application. . . . . Another speaker discussed an alternative for the common practice of shrinking a ring onto a shaft—namely, cooling the shaft by refrigeration and permitting it to expand to fit. . . . . Steelmakers are experimenting with ingot mold stool inserts of copper (p. 36) to gain the benefits of the rapid dissipation of heat afforded by the red metal.

• • •

A. I. S. C. Pinch Hits Again

Indicative of the cosmopolitan interest in broader markets for steel, the third international congress for steel development, held in London, attracted representatives from eight countries. Vincent Delport, European manager of STEEL, reports (p. 25) that the delegates voiced regret that the United States did not send a representative. The single evidence of American interest—a paper on steel house construction (p. 23) by a Detroit fabricator—was furnished upon invitation by the American Institute of Steel Construction Inc. In again "saving the day" for the American steel industry, the institute simply repeats the service it has rendered on many previous occasions. Since its founding in 1921, it has done more than any organization to extend the use of rolled steel.

E. L. Shaner

Labor Trouble in Steel Fades As New Board Takes Hold

Washington

IRON and steel labor troubles appear to have receded far into the background following the creation of the national steel labor relations board by the President June 28—which is precisely the reaction sought.

Executives having conceded the last word concerning labor to an impartial board and having agreed to representation of majorities in collective bargaining, they removed the two principal irritations to labor as represented by the Amalgamated Association of Iron, Steel and Tin Workers.

Accordingly, for the present at least, organized labor in the steel industry has lost the offensive, and executives no longer are on the defensive. And with production considerably off the recent peak, jobs become more desirable and even the "rank and file" committee of the Amalgamated has subsided.

Board Clears the Decks

The labor board, meanwhile, is settling down to its task. It has virtually been in seclusion the past week and gives the sense of being judicial. It has not established any relations with the press, and gives no indications of doing so immediately.

Publicity-seeking politicians or labor leaders by this time would have broadcast their contemplated procedure, but Judge Stacy, chairman, has brought to the labor board the calm dignity of his North Carolina court, while Admiral Wiley contributes the discipline of the nation's sea service and Mr. Mullenbach has been through too many labor controversies to act impulsively in any situation.

Secretary of Labor Perkins, who created the board and obtained steel executives' approval prior to disclosure of its personnel, is given credit in Washington for having set up a truly impartial board, the strongest board yet developed by the administration and one likely to be stronger than the improvised statute under which it was created.

It is understood that in its early days the board is studying intensively the immediate labor problem in the steel industry, and that inspection trips to mills will be made. Emphasis is laid upon this situation—that the board is under no commitments to any interests.

On Friday the board received assurances of co-operation from both the United States Steel Corp. and the Amalgamated association. Myron C. Taylor, chairman of the Corporation, notified the board that he is ready to supply data concerning its relations with its employes. Charlton Ogburn, attorney for the Amalgamated, personally submitted documentary data for the information of the board and advised it of the Amalgamated's desire to be of assistance.

Old NLB Abdicates

Just before leaving on his ocean cruise the President appointed a labor board, known as the national labor relations board, to succeed the NRA board headed by Senator Wagner and to be superior to special boards named by specific industries, such as the one for steel. The steel board, however, will be autonomous and the new national board will hear appeals from it.

On this national board are Lloyd Garrison, dean of Wisconsin law school, as chairman; Harry A. Millis, in charge of the department of economics at the University of Chicago; and Edwin S. Smith, NRA labor compliance officer for Massachusetts.

Within another week, it is expected, procedure will have been worked out and some announcement made.

Other Washington News

Up to late Friday, July 6, no ruling has been made that steel was exempted from the President's executive order authorizing bidders on government contracts to cut code prices 15 per cent, nor had the American Iron and Steel institute formally requested such exemption. It is expected, however, that the institute will seek such action in case any bidder should take advantage of the situation, and any decision made by NRA would be subject to review by its counsel.

Practically all industries were thrown into turmoil last week following the publication of the executive order. Bituminous coal executives immediately contended that a 15 per cent reduction would demoralize their industry, and obtained the desired exemption. Since any concessions up to 15 per cent on government bidding must be reflected immediately in prices to the public, all of the price regulatory features of NRA are open to destruction inasmuch as successive 15 per cent reductions are possible.

The President's order was incited by Secretary of the Interior Ickes, who also is PWA administrator and has been annoyed by identical bids on cement and other materials for

SUPREME COURT OF STEEL LABOR: First meeting, last week, of new national steel labor relations board appointed by President Roosevelt. Left to right are Dr. James A. Mullenbach, of Chicago, long prominent in the garment trades; Admiral H. A. Wiley, retired; Judge Walter P. Stacy, chief justice of the North Carolina supreme court and chairman of the board. Wide World photo

public works. The navy also has been restive under identical bids and has had to draw awards out of a humidor.

¶Domestic manganese, perennially a trouble maker for steel producers, came to the front last week with the following demands presented to the President via the American Manganese Producers association: (1) enforcement of title III of the treasury-postoffice appropriation act so as to require domestic manganese in steel used on public works; (2) limitation of manganese imports under section 3e of NIRA to further the employment of labor, and (3) the purchase and storage of domestic manganese ore by the war department for future emergencies.

See Employment for Thousands

According to the Manganese association, 5000 to 7000 men can be put to work immediately. Domestic producers can deliver ore of a higher grade than imports at or less than the 68.19c per unit which was the average price of foreign ore delivered in Pittsburgh 1926-29. Also, that the present productive capacity of 200,000 tons of manganese ore annually can be utilized, supplying about half of the estimated requirement for manganese ore in this country this year.

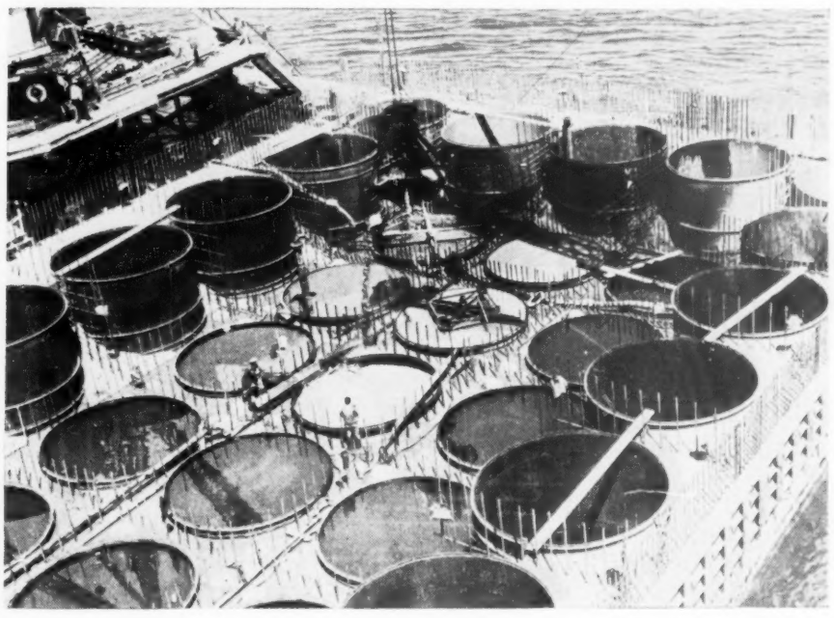
¶Bids on construction of 4 cruisers, 14 destroyers and 6 submarines, requiring approximately 35,000 tons of plates, shapes and bars for hulls, will be received by the navy department Aug. 15. Construction will be equally divided between navy and private yards. PWA is contributing $40,700,000 to the cost.

¶One of the final acts of the President before leaving Washington July 1 was to abolish the NRA recovery review board headed by Clarence Darrow, the foe of steel and other codes and the butt of NRA Administrator Johnson's choicest epithets. In its swan song the Darrow board charged high officials of NRA with crooking their respective knees before the Baal of steel.

¶The President's new tariff machinery—the committee for reciprocity information—began functioning July 3 when it announced that negotiations for a trade agreement with Cuba would be initiated within a period of 30 days.

Institute

B. F. FAIRLESS, executive vice president of the Republic Steel Corp., has been appointed chairman of the commercial committee of the American Iron and Steel institute, New York. He succeeds S. E. Hackett, whose additional duties as president of the Jones & Laughlin Steel Corp., Pittsburgh, preclude his continuing as the active head of this important committee.



SAN FRANCISCO-OAKLAND BAY BRIDGE CAISSON NEARING COMPLETION: Built up of steel and concrete from a bed rock base 192 feet below water level, this 92 x 197-foot caisson for pier 4 of the bridge is being rapidly completed. This view, taken from the top of a derrick boom, shows the cellular construction of the caisson, 55 steel cylinders or dredging wells providing access to the ocean floor. The caisson is sunk into position by building up these steel cylinders and pouring concrete around them. Later, each cylinder itself will be filled with concrete. For complete description of the construction method refer to STEEL *for Feb. 19, p. 26. The pier required 3537 tons of plates and 1452 tons of shapes. Acme photo*

Capacity

NATION'S steel ingot capacity totaled 69,390,625 gross tons in 1933, according to the American Iron and Steel institute, New York. This is an increase of 1,191,449 tons, or 1.7 per cent over 1932, and is the largest capacity ever reported for the industry.

This gain, however, was the smallest in a decade, with the exception of two years when there was a decrease of 2,594,383 tons in 1925 and 99,780 tons in 1932. The average increase the past decade was 1,095,220 tons per year and the total gain in capacity for the past ten years was 10,952,202 tons, of which 6,323,061 tons was registered since the end of 1929.

The annual capacity of pig iron and ferroalloys in 1933 gained 654,086 tons, or 1.3 per cent, to total of 51,110,061 tons. Capacity of steel castings declined 29,104 tons, or 1.4 per cent, last year, to 1,963,151. Among ingots, basic open hearth showed the largest gain, increasing to 59,622,517 tons from 58,609,140 tons.

Other increases were noted in acid open-hearth capacity of 79,306 tons, making a total of 961,296 gross tons, and in electric steel ingots of 102,152 tons to a total of 895,112 tons.

Bessemer steel capacity stood unchanged at 78,950 tons. Crucible steel capacity declined from 20,086 tons to 16,700 tons. Pig iron capacity last year increased 668,086 gross tons, making a total of 50,321,661 tons, but ferroalloys declined 14,000 tons to a total of 788,400. All figures are gross tons.

Labor

WAGE conference of the Western Sheet and Tin Plate Manufacturers association and the sheet and tin plate committee of the Amalgamated Association of Iron, Steel and Tin Workers was to be resumed July 10, probably in Pittsburgh.

This will continue the conference adjourned at Pittsburgh on June 28. A new wage scale governing independent sheet and tin plate employes affiliated with the Amalgamated to succeed the scale that expired June 30 will be considered.

Financial

OHIO FORGE & GEAR CORP. is the name proposed for Gears & Forgings Inc., of Cleveland, under a reorganization plan to be heard in Cleveland, July 10, in federal court. Gears & Forgings, long in receivership, was a consolidation in

1927 of the Van Dorn & Dutton Co. and Ohio Forge Co., Cleveland; Fawcus Machine Co., Pittsburgh, and the William Ganschow Co., Chicago.

¶Federal court in Buffalo, July 30, will formally hear application of the bondholders' group of the Wickwire Spencer Steel Co. which has petitioned for a reorganization under the new federal bankruptcy act. The company through G. H. Creveling, secretary, is opposing the application, maintaining that such a reorganization is not required. Charles L. Feldman and Edward C. Bowers have been continued as equity receivers pending the hearing.

¶A hearing will be held in the federal district court at Pittsburgh, July 17, to determine whether appointment of trustees for Follansbee Bros. Co., sheet manufacturers, shall be made permanent or be terminated or any trustees removed under the desire to effect a plan of reorganization by the bankruptcy act approved June 7. Notice to this effect is being given to creditors and stockholders of the company by John Follansbee and George T. Ladd, trustees in receivership the past few weeks.

Production

LAST week's steel operating rate of 22 per cent, which was a precipitate break from 46 per cent the week preceding and the depression high of 62 per cent attained in the middle of June, was an artificial low, created largely by the Independence day holiday, the termination of second quarter contracts and the unsettled price situation, coupled with a desire by many producers to give their employes a mid-summer holiday.

This week operations will rebound at least to 33 per cent and probably slightly higher. Not since the second week of February have operations been below 40 per cent. It will be next week before the full effects of the holiday have worn off and a true gage obtained of what may be expected in the remainder of July and in August. Details for districts:

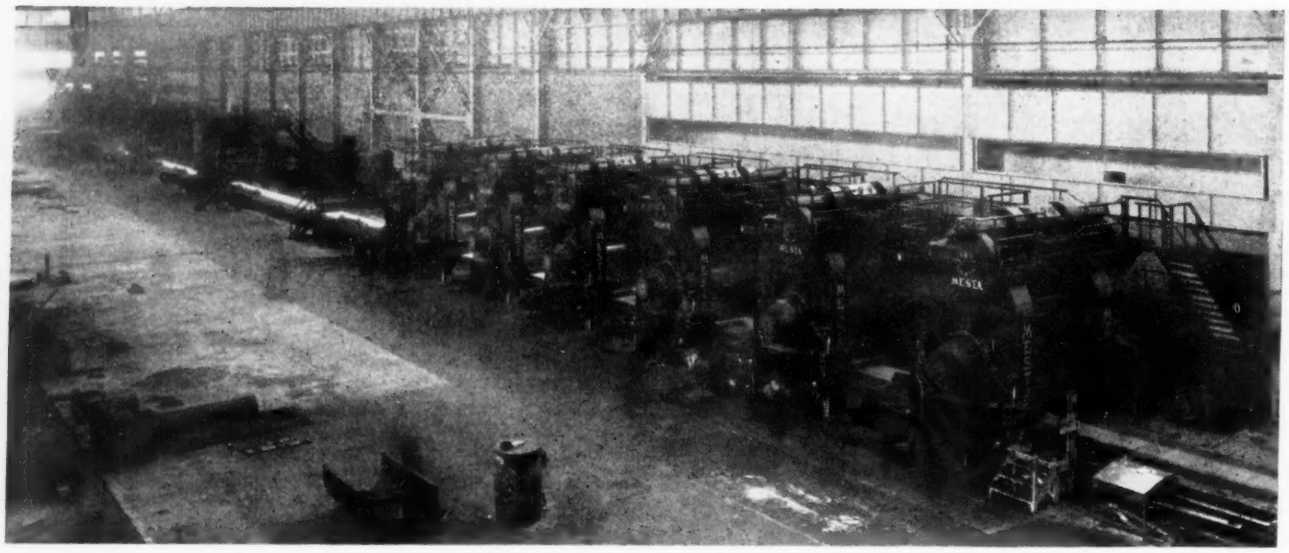
Chicago—Settled to 28 per cent last week, a loss of 23 points, accompanied by the banking of two more blast furnaces. Ten of the district's 36 steelworks stacks now are in blast. Although changes in the volume of orders the next several days may cause a revision in schedules, no improvement in steelmaking is planned for this week, and some plants foresee a further slight recession.

Wheeling—Steel ingot production was at 24 per cent last week, down 38 points, with 9 open-hearth furnaces out of 39 on. For this week, a gain of 50 per cent is expected, lifting the rate to 36 per cent, with several mills reopening after a week's holiday.

Pittsburgh—Went down to 15 per cent last week, a decline of 25 points from two weeks ago. This week, schedules will rebound slightly but will not average above 25 per cent. A large part of operating schedules for this week are in finishing steel to round out mill stocks. This applies to not only some semifinished steel but also many of the finished materials.

As of the close of last week, there were eight fewer blast furnaces operating with but 12 out of 60 numbered on the active list. Carnegie Steel Co. has 5 of 32 now on; Bethlehem Steel Co., 2 of 7; Jones &

Costs Millions for Chips in Game Steel Mills Are Playing



STEELMAKERS bidding for wide sheet and strip business are playing the most expensive game in the history of the industry. It costs between $6,000,000 and $12,000,000 to hold a "hand"—a wide continuous type mill—but the alternative is to quit. Last week the Great Lakes division of the National Steel Corp., at Detroit, signified its intention of sitting in the game when it inquired of two equipment builders in the Pittsburgh district for a continuous mill, both hot and cold, costing upward of $12,000,000, capable of rolling sheets 75 inches wide and further processing them by cold rolling. Only three weeks ago the Youngstown Sheet & Tube Co. ordered from the Mesta Machine Co., Pittsburgh, a continuous mill, for hot rolling only, costing about $6,000,000, for erection at its Campbell (Youngstown) works. A month ago the Ford Motor Co. ordered a wide continuous mill for its River Rouge steelworks at Detroit; the Carnegie Steel Co. has plans for such a mill at Youngstown; the Bethlehem Steel Corp. is considering one for either Lackawanna (Buffalo), N. Y., or Sparrows Point, Md. Pictured above is the Inland unit, built by the Mesta Machine Co., Pittsburgh, which will practically duplicate it for Sheet & Tube. This mill is equipped with hot rolls 76 inches wide. For continuous strip the width rolled varies from 24 to 26 inches, depending on commercial requirements and gage; and for plates from $\frac{7}{16}$ to $\frac{1}{2}$-inch thick up to 69 inches wide Reeling off its product in coils or flat cut to length, such a mill has a capacity of 2200 tons per 24 hours, or practically 680,000 tons a year. An ordinary hot sheet mill with eight mills is rated at 60,000 tons a year, and when mechanized can be stepped up to a top of 300,000 tons. Only the automotive industry can satisfy the enormous requirements of such mills for tonnage and it is interesting to note how the Great Lakes region is girdled by such mills, built or projected, at Indiana Harbor, Cleveland, Youngstown, Buffalo, Detroit

Laughlin Steel Corp., 3 of 11, and 1 of 2 each for Pittsburgh Crucible Steel Co. and American Steel & Wire Co., and none on for Pittsburgh Steel Co. Both of the Monongahela stacks of National Tube Co. are banked, with resumption being scheduled for one furnace this week.

Buffalo—For the first time in recent years, Buffalo steelworks have suspended production completely for a period of ten days. Not an open hearth has produced an ingot since June 30. This week a 21 per cent level is forecast, with about eight open hearths scheduled to be in operation. The holiday, which had been planned to end on July 5 in some plants, was prolonged when new demand failed to appear as anticipated.

Birmingham — Gulf States Steel Co., at Gadsden, was closed last week and will be this week. Open-hearth furnaces at the Ensley works of the Tennessee Coal, Iron & Railroad Co. also will be taken off this week. Operations, therefore, are down to an average of about 17½ per cent, compared with the 55 rate which has been obtaining for a number of weeks.

Cleveland—Lorain—Averaged 26 per cent last week, down 38 points. National Tube Co., Lorain, operated nine open hearths up to July 4 and then took all off until July 9, when it will resume with six or eight. Corrigan, McKinney Steel Co. had all of its open hearths off the line until July 5 when it resumed with six, while Otis Steel Co. was down all week. The rate this week will be approximately 36 per cent.

Detroit—After falling off 47 points last week to stand at 46 per cent, operations among two district producers regained all of their loss and were at 93 per cent as this week begins. Sixteen out of 17 open-hearth furnaces are now active here.

New England—Dropped 10 points last week to 55 per cent, and this rate is scheduled to hold starting this week.

Youngstown—Down 29 points last week to 15 per cent, and the rate is expected to rebound to 35 per cent this week. Carnegie Steel Co. is expected to resume production at its Farrell and Ohio works this week. Youngstown Sheet & Tube Co. resumed operations at its Brier Hill sheet mills last week, and this week plans to put on its Campbell sheet mills also.

Speculation concerning June shipments of finished products by the United States Steel Corp. places the figure at well over 850,000 tons and possibly closer to 900,000 tons, making it the largest for any month since April, 1931. In May the corporation shipped 745,054 tons. First half year shipments of the corporation thus approximated 3,500,000 tons, compared with 2,200,000 tons in 1933.

NRA

VARIOUS code authorities have been approved by NRA the past week including:

Gear manufacturing industry: H. H. Kerr, North Quincy, Mass.; R. C. Ball, Philadelphia; Richard Ferguson, Gastonia, N. C.; Howard Gingle, Cleveland; F. H. Fowler, Chicago; Frank B. Drake, Berkeley, Calif., the American Gear Manufacturers' association, Cutter P. Davis, Springville, N. Y., and as the latter's alternate, Rodney Davis, Philadelphia.

Representing shipbreakers on the iron and steel code: Morris Schapiro of the Boston Iron & Metal Co., Boston.

Administration member on the drop forging code: R. P. Danforth, for 20 years professor of mechinics and materials at Case School of Applied Science, Cleveland.

Members of the complaints board for the metal treating industry: Ralph J. Hoonsheid, 6100 Tireman avenue, Detroit; W. S. Bidle, 1408 East Forty-seventh street, Cleveland; Theodore Wiedmann, 1815 Sedgley avenue, Philadelphia; A. D. Bach, 9 Alger street, South Boston, Mass., and Arthur H. Nuesse, 1333 West Pierce street, Milwaukee.

Members of the trade practice committee of the refractories industry to administer fair trade provisions of the refractories code: Roger A. Hitchins, president, American Refractories institute, Philadelphia; A. P. Green, president, A. P. Green Fire Brick Co., Mexico, Mo.; F. L. Greon, vice president, General Refractories Co., Philadelphia; J. E. Lewis, president, Harbison-Walker Refractories Co., Pittsburgh; J. D. Ramsay, president, North American Refractories Co., Cleveland; H. L. Tredennick, president, Haws Refractories Co., Johnstown, Pa.; and W. J. Westphalen, vice president, Laclede Christy Clay Products Co., St. Louis.

Steel Ingots Nearly Double 1933 Rate

SIX months production of steel ingots in the United States in 1934 is almost double that for first half of 1933, according to figures of the American Iron and Steel institute. Calculated monthly output of all companies for six months of this year is 16,180,889 gross tons, compared with 8,989,192 tons for the corresponding period in 1933, a gain of 7,191,697 tons. The daily rate of production for six months of 1934 was 103,724 gross tons and in first half of 1933 it averaged 57,994 tons.

Production in June was 3,015,972 tons, compared with 3,352,695 tons in May. The daily rate in June was 115,999 tons, compared with 124,174 tons in May. The percentage of capacity engaged in June was 52.68 and in May 56.39.

Steel Ingot Production — 1933-34

96.57 Per Cent of Industry Reporting
Gross Tons

1933	Open-hearth	Bessemer	Monthly output companies reporting	Calculated monthly output all companies	No. of working days	Approximate daily output all companies	Per cent operation
Jan.	885,743	109,000	994,743	1,030,075	26	39,618	18.23
Feb.	922,806	126,781	1,049,587	1,086,867	24	45,286	20.83
Mar.	784,168	94,509	878,677	909,886	27	33,699	15.50
Apr.	1,180,893	135,217	1,316,110	1,362,856	25	54,514	25.08
May	1,716,482	216,841	1,933,323	2,001,991	27	74,148	34.11
June	2,211,657	296,765	2,508,422	2,597,517	26	99,904	45.96
6 Mos.	7,701,749	979,113	8,680,862	8,989,192	155	57,994	26.62
July	2,738,083	355,836	3,093,919	3,203,810	25	128,152	58.95
Aug.	2,430,750	370,370	2,801,120	2,900,611	27	107,430	49.42
Sept.	1,991,225	242,016	2,233,241	2,312,562	26	88,944	40.92
Oct.	1,847,756	191,673	2,059,429	2,111,866	26	81,226	37.37
Nov.	1,331,091	156,939	1,488,030	1,540,882	26	59,265	27.26
Dec.	1,624,447	132,787	1,757,234	1,819,648	25	72,786	33.48
Total	19,665,101	2,428,734	22,093,835	22,878,571	310	73,801	33.95
1934		**98.10 Per Cent of Industry Reporting**					
Jan.	1,786,467	172,489	1,958,956	1,996,897	27	73,959	34.13
Feb.	1,993,638	175,873	2,169,511	2,211,569	24	92,147	42.53
Mar.	2,540,143	203,904	2,744,047	2,797,194	27	103,600	47.81
Apr.	2,622,372	257,482	2,879,854	2,935,631	25	117,425	54.19
May	3,000,624	331,620	3,332,244	3,352,695	27	124,174	56.39
June	2,714,983	282,592	2,997,575	3,015,972	26	115,999	52.68
6 Mos.	14,658,227	1,423,960	16,082,187	16,180,889	156	103,724	47.11

Figures exclude crucible and electric ingots. All the operating percentages are based on 67,386,130 gross tons annual capacity as of Dec. 31, 1932.

25 Blast Furnaces Go Out in June; Output Down Slightly

AFTER five months of ascending operations in which 43 blast furnaces were returned to production, June proved to be the turning point and 25 furnaces were blown out or banked.

This was the largest drop in furnaces in any month since November, 1929, when 27 were taken off blast. Active furnaces increased steadily from 74 on Dec. 31 to 117 on May 31, then fell to 92 on June 30. Indicative of further recession, three more stacks are known to have gone out since June 30.

Largely because most of the blast furnaces were taken out near the end of the month, production of coke pig iron in the United States in June was only slightly below the May output. Average daily production for the month just closed was 64,563 gross tons, a decrease of 1807 tons per day, or 2.72 per cent, from the 66,370-ton daily rate of May. The June rate compares with 57,873 tons in April and 42,165 tons in June, 1933.

AVERAGE DAILY PRODUCTION

	1934	1933	1932	1931
Jan.	39,537	18,348	31,336	55,337
Feb.	45,385	19,752	33,122	61,114
Mar.	52,438	17,484	31,194	65,448
Apr.	57,873	20,786	28,524	66,986
May	66,370	28,784	25,282	64,355
June	64,563	42,165	20,867	54,599
July		58,108	18,394	47,170
Aug.		59,137	17,035	41,264
Sept.		50,264	19,788	38,947
Oct.		43,824	20,795	37,831
Nov.		36,124	20,858	36,727
Dec.		38,456	17,650	31,625
Av.	54,434	36,223	23,699	50,035

Total production for June was 1,936,897 tons, which, compared with the 2,057,471 tons of May, was a loss of 120,574 tons, or 5.85 per cent. A part of this loss is accounted for by the fact that June was a one-day shorter month than May.

Production for the first half of 1934 aggregated 9,852,608 tons, an increase of 5,407,858 tons or 121 per cent, over the 4,444,750 tons made in the first six months of 1933. This was the largest half-year total since 1931 when the figure was 11,098,122 tons.

Relating production to capacity, the operating rate for June was 46.8 per cent, as compared with 48.0 per cent in May and 42.0 per cent in April. In June, one year ago, the rate was only 30.6 per cent.

The 92 blast furnaces making iron on June 30 was the smallest number in blast since last February with 90. During the month 26 furnaces were blown out or banked and only 1 was blown in, making the net loss 25. Of the nonmerchant or steelworks class, 1 was blown in and 25 blown out; of the merchant class, none was blown in and none blown out.

MONTHLY IRON PRODUCTION

	1934	1933	1932
Jan.	1,225,643	568,785	971,437
Feb.	1,270,792	553,067	960,550
Mar.	1,625,588	542,013	967,015
Apr.	1,736,217	623,606	855,734
May	2,057,471	892,326	783,769
June	1,936,897	1,264,953	626,015
Total 6 mo.	9,852,608	4,444,750	5,164,520
July		1,801,345	570,222
Aug.		1,833,265	528,105
Sept.		1,507,931	953,640
Oct.		1,358,540	644,648
Nov.		1,083,740	625,753
Dec.		1,192,136	547,179
Total		13,221,707	8,674,067

Furnaces blown out or banked in June were: In Ohio: Haselton No. 3, Republic Steel Corp.; Trumbull Cliffs, Trumbull-Cliffs Furnace Co.; Ohio D, Youngstown Sheet & Tube Co.; Jisco, Jackson Iron & Steel Co.; Lorain Nos. 4 and 5, National Tube Co.; Mingo Nos. 2 and 4, Carnegie Steel Co. In Pennsylvania: Cambria E, H and J, Bethlehem Steel Co.; Monongahela Nos. 1 and 4, National Tube Co.; one Eliza and two Aliquippa, Jones & Laughlin Steel Corp.; Clairton No. 1 and Duquesne Nos. 3 and 4, Carnegie Steel Co. In New York: Buffalo No. 2, Republic Steel Corp.; Lackawanna B, Bethlehem Steel Co. In Maryland; Maryland E, Bethlehem Steel Co. In Illinois: South Works Old No. 2 and South Works New No. 10, Illinois Steel Co. In Indiana: Gary Nos. 7 and 9, Illinois Steel Co.

The only furnace blowing in was the Norton stack of the American Rolling Mill Co. in Kentucky.

Furnaces blowing out or banking since July 1 are not included in the foregoing tabulation, however, the following are known to have discontinued operation since the first of the month: Ohio No. 2, Carnegie Steel Co. in Ohio; Shenango, Shenango Furnace Co. in Pennsylvania; and Rockdale, Tennessee Products Corp. in Tennessee.

Resuming in May but not listed in the tabulation appearing in the June 4 issue of STEEL were the Troy furnace of the Troy Furnace Corp. in New York and the Benson furnace of the Ford Motor Co. in Michigan.

American Rolling Mill Co. is dismantling the Belfont blast furnace at Ironton, O., acquired recently from the Belfont Steel & Wire Co. This furnace had an annual capacity of 96,000 tons. With its demolition, the total number of potential blast furnaces in the United States is reduced from 284 to 283.

JUNE IRON PRODUCTION

	No. in blast last day of month June	May	Total tonnage Merchant	Nonmerchant
Ohio	24	32	75,700	460,437
Penna.	24	35	55,155*	499,885*
Alabama	10	10	66,890	68,854
Illinois	6	8	30,852	125,253
New York	7	9	69,401	62,098
Colorado	1	1		
Indiana	6	8	7,384	272,168
Maryland	3	4		
Virginia	0	0		
Kentucky	2	1		
Mass.	0	0		
Tennessee	1	1		
Utah	1	1	6,709*	136,011
West Va.	3	3		
Michigan	4	4		
Minnesota	0	0		
Missouri	0	0		
Total	92	117	312,191*	1,624,706*

*Includes ferro and spiegeleisen.

RATE OF OPERATIONS

(Relation of Production to Capacity)

	1934[1]	1933[1]	1932[2]	1931[3]
Jan.	28.7	13.3	22.1	38.4
Feb.	32.9	14.3	23.4	42.5
Mar.	38.0	12.7	22.0	45.4
Apr.	42.0	15.1	20.2	46.5
May	48.0	20.9	17.9	44.7
June	46.8	30.6	14.7	37.9
July		42.2	13.0	32.7
Aug.		42.8	12.0	28.7
Sept.		36.4	14.0	27.0
Oct.		31.8	14.7	26.3
Nov.		26.2	14.7	25.5
Dec.		27.9	12.5	22.0

[1]Based on capacity of 50,313,975 gross tons, Dec. 31, 1932; [2]on capacity of 51,598,175 tons; [3]on capacity of 52,515,875 tons. Capacities by American Iron and Steel institute.

Meyer Co. Bonuses in 11 Months Exceed $100,000

George J. Meyer Mfg. Co., Cudahy, Wis., suburb of Milwaukee, a leading manufacturer of automatic machinery for breweries, dairy plants, distilleries, etc., has just distributed a substantial bonus among its 550 employes, bringing the total so presented to the force within the last 11 months upward of $100,000, it is announced. In a letter to employes, George J. Meyer, president, explains that the bonus is paid from profits, and goes to all men and women who have been on the payroll from July 1, 1933. Another bonus within 30 to 60 days is in prospect, pending the results of the fiscal year which ended June 30.

MIRRORS OF MOTORDOM

DETROIT

UP THROUGH last week the ink was drying on a big batch of checks in Detroit. All told, the vouchers added up to somewhere between twenty and thirty million dollars.

The John Hancock of the automobile industry was on the bottom line—payment was made out to the die industry. It was the start on as big a die program as in any year since 1928 or 1929.

Twenty to thirty millions may be small change alongside unbridled government spending these days, but it is no piker figure for a private industry to earmark just for body changes in 1935 automobiles.

The industry—chiefly General Motors and Chrysler—is satisfied by now with the plans it has drawn for next year, so satisfied in fact that it is staking a fortune on them.

These twenty-odd millions will be considerably more than the industry has spent on die work in any of the past four depression years. It is no secret in Detroit that the changeover programs of especially 1932 and 1933 were makeshift affairs.

Spend 90 Per Cent on Bodies

Many dies made in those years had the corners cut on quality. Especially in tool expenditures were a good many replacements necessary later in the year.

However, the industry is by now convinced that real money can be brought out of hiding to back up the streamlining designs that were pioneered the past year or so. In other words, the market is sold. More permanent die and tool work is on the verge of being installed.

A striking peculiarity of this 1935 program is that virtually 90 per cent of the funds will go no farther than for chassis and body-making equipment. So, of every dollar, over 90 cents will be for dies, presses, welders, etc.

Motors and transmissions next year will be sadly neglected for the more ostentatious exterior of the automobile. About the only transmission change promised is a wider adoption of Chrysler's overdrive that makes for greater transmission of flexibility and reduced engine speed.

In other words, along about next January when show time rolls around the American public will be shown curves and more curves, but there'll be few surprises under the hood.

Die work, as before stated, started to move last week. The Plymouth and Dodge changes were ready for the final O. K. then. General Motors began distributing work piecemeal, though some, such as that for Pontiac, has been out for sometime.

Brokers are again being used this year to throw bloodhounds off the scent. Last year, for example, Chrysler kept secrets on the air-flow models' detail by having midwestern brokers buy all the tool and die work and scatter it as far flung as possible.

Yet, ultimately Detroit's shops will benefit most. Tool and die strike or not, that industry's union has lost many of its stripes since last fall's imbroglio and is once again peacefully eager for work.

Most of this work now being awarded will not be ready for installing in the assembly plants until October. The only exceptions are in the 1935 Packard program, now completed, and those plans of such as Pontiac where a presentation to the public is planned later in the fall. Here, it is worthy of note that Pontiac may fit into Buick's former niche—the early bird of General Motors on model changeover.

Incidentally, in connection with next year's plans Detroit has listened for some time to the reports that leaf springs are coming back, at least into a share of their own again, next year as optional equipment by all of the present coil-springers.

It seems a safe bet that those few, chiefly Ford, that did not take up coil springing will not flop over next year. All that took up coiled springing this year likely will stand pat in a sense, yet branch out by giving the leaf spring option to conservatives.

Watching Trends in Car Size

At this point, two contrary trends are quite evident. Next year's Chevrolet and Plymouth, just to mention two, undoubtedly will follow through the trend of past years in making models longer in wheelbase, wider and roomier.

Ford, on the other hand, if he keeps his small car active, will buck this trend by shaving down his car in size. By so doing he follows in the unfortunate wake of such as Austin and Willys-Overland.

So, there arises the question of what, after all, does the American public want—cheap transportation or ostentation?

On the very day the recent reduc-

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1932	1933	1934
January	119,344	130,087	156,907
February	117,418	106,888	231,707
March	118,959	118,002	331,263
April	148,326	180,713	354,745
May	184,295	218,347	331,641
June	183,106	253,387	.....

Estimated by *Cram's Reports*

Week ended	
June 2	54,185
June 9	69,107
June 16	71,293
June 23	70,330
June 30	80,936
July 7	30,493

tions in the finished steel prices were filed with the American Iron and Steel institute in New York, General Motors and Chrysler buyers knew them, evidencing the increasing concentration in these two groups of the automotive industry's requirements for flat rolled products.

With Ford now installing his own wide sheet and strip mill, General Motors and Chrysler will be the battleground for the lucrative sheet and strip business. Indeed, the higher the market the greater the benefit to Ford, because the market would not only justify Ford costs—always higher than that of steelmakers on account of peculiarities in Ford mill practice—but also would raise the material cost of its competitors.

Incidentally, Ford this week is bringing groups of dealers in the central states on different days to the Century of Progress exhibit in Chicago. Such an assemblage of dealers always leads to speculation concerning a change, especially after the plant has been down, which it has for ten days.

With all Chrysler divisions except Plymouth, and Ford, Graham, Studebaker and Terraplane-Hudson down, assemblies last week declined to 30,493 units, less than half the 80,936 assembled in the week ended June 30. No comparison is possible, of course, because of the July 4 holiday and then ten-day shutdowns of some makers.

Reductions Almost Universal

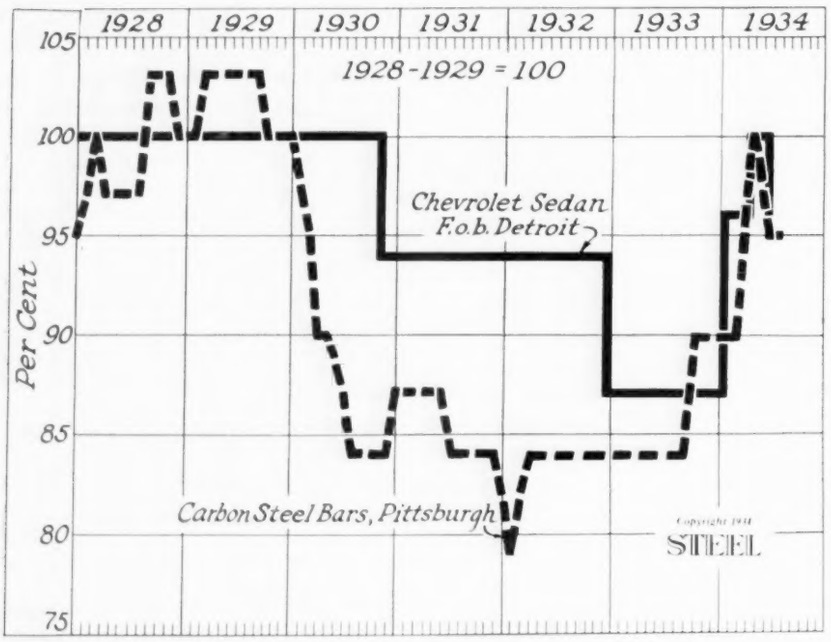
Buick last week assembled 2000 units, compared with 2500 the week before. Chevrolet was off 7800 units to a total of 16,000. Hupp was unchanged at about 280. Olds maintained its daily schedule, the holiday dropping the total from 3000 units the week before to 2400.

Plymouth assembled 4000 cars, compared with 12,850 the week before. Other rates for last week, in every case a slight reduction, include Auburn 140, Pontiac 700, and Reo 400. Willys-Overland, being offered a loan of only $500,000 by the RFC, is petitioning federal court for permission to build another batch of cars. The original court order authorizing 7500 has been worked off.

Packard, which has been assembling about 75 units a week, is now talking openly of its new model and is offering reductions up to $700 on current jobs.

What Detroit is talking about: Murray will continue to make all of the Packard custom bodies on 1935 models. . . . Hudson reports retail sales still gaining. . . . A 20-cylinder engine capable of 300 horsepower has been developed by Nuway Engineering Co., Detroit. . . . Ternstedt Mfg. Co., subsidiary of General Motors producing automotive hardware, and good bellwether of assemblies, made parts for 85,000 G. M. cars in June, but in July will produce hardware for 100,000. . . . Auburn's new car will be merchandised under a new name. . . . Austin at Butler, Pa., has petitioned for federal funds to produce what it claims is an unfilled order backlog amounting to 2000 cars. Other motor car makers that recently have asked for federal funds for needed working capital have been Pierce-Arrow, Studebaker and Willys-Overland.

Steel and Auto Prices Now at Parity



REDUCTIONS in finished steel prices the past week exactly measure up to the decreases in f.o.b. prices of automobiles and the parity that has existed since early this year is maintained. In the accompanying chart, the f.o.b. Detroit price of a Chevrolet sedan is assumed to be typical of the price trend of the automobile industry, while carbon steel bars at Pittsburgh are used as the gage of finished steel. Both have been reduced to an index, 100 being the average price for 1928 and 1929. In a great majority of months since the beginning of 1928 bars have been priced relatively lower than the Chevrolet sedan. Today, at 1.80c, bars are priced identical with January, 1928, while a Chevrolet sedan then was $675 and now is $640. Forging, cold-finished and other bar products used so extensively at Detroit bear a direct relationship to the carbon bars charted above. Wide hot-rolled strip steel from 1928 to 1934 has fluctuated almost identically with bars, the range being 75 to 102, also on the basis of 1928 and 1929 equaling 100.

Philadelphia Steel Club Outing Sets High Record

Three hundred, including members and guests, by far the largest attendance in the history of the organization, turned out for the annual outing of the Steel Club of Philadelphia at the Aronimink Golf club, near Philadelphia, June 29. Present were many out-of-town guests, including men from Cleveland, Youngstown, O., Baltimore, Washington and New York. Two hundred participated in the golf tournament, which was a high spot in the day's program of entertainment.

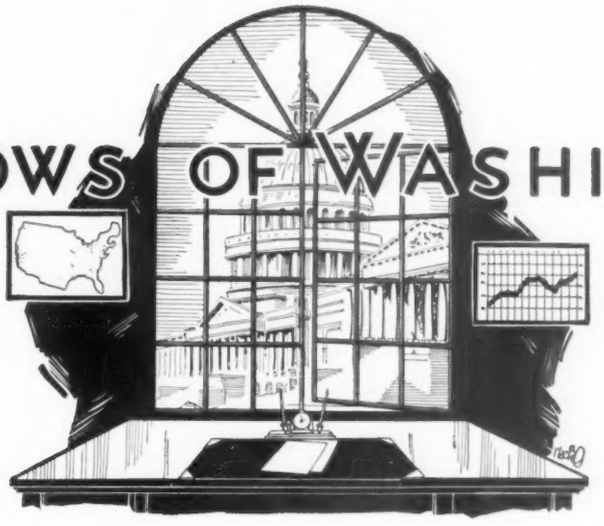
Dinner in the evening was featured by the distribution of more than 50 prizes. Frank L. Stephenson, Bethlehem Steel Co., president of the club, presided at the beginning, then withdrew in favor of L. L. Caskey, Republic Steel Corp., chairman of the committee on golf and arrangements, who announced the awards.

Herbert Calves, Taylor-Davis Inc., Philadelphia, was awarded the low gross prize in Class A of the golf tournament; Christie Morris, Morris low net prize in Class A; Fred Corey, Bethlehem Steel Co., Bethlehem, Pa., the low gross prize in Class B, and W. Dougherty of the same company, the low net trophy in that class.

Harry G. Uphouse, Philadelphia Steel Sales Co., Philadelphia, won the putting contest, with H. L. Buyer, Edgecomb Steel Co., Philadelphia, second, and Harry Rowbotham, Belmont Iron Works, Philadelphia, third.

Henry A. Lowry, Seaboard Steel & Iron Corp., Baltimore, on a special drawing, won a set of matched clubs and a leather golf bag.

WINDOWS OF WASHINGTON



WASHINGTON

CONGRESS is adjourned, the President is on the high seas, and outwardly Washington gives every appearance of having succumbed to midsummer inertia, but in shirt sleeves behind drawn blinds the capital is sweltering over this extraordinary accumulation of problems:

How does the present wave of reductions in commodity prices square with the new deal objective of raising prices in order to support larger payrolls and lighten the burden of debt?

How far will the new national housing administration—NHA—go toward reviving building and priming the pump of the durable goods industries?

Will the new securities commission prove conservative enough to instill confidence in the stock market and breed a late summer upturn in the market as the prelude to a fall pickup in business?

To what extent will RFC loans to industries perk up the banks and make them want to push their own funds out to companies able to meet the rigid RFC specifications?

Will the Frazier-Lemke farm moratorium act divert to commodities the funds farmers would have applied to their mortgage obligations, or will it merely unsettle the mortgage market and lead to a demand for similar favorable treatment of city debtors?

Will the social and industrial planning studies to be made this summer by Donald Richberg, former chief counsel of NRA, and others lay the groundwork for an intensified new deal?

Of this, business may be certain. With congressional elections coming on and "Are you better off than a year ago?" probably the Democratic campaign slogan, the new dealers are anxious that there be decided improvement this fall. They will give a leg up to business for this reason—but it will be according to their lights!

FROM the heights on which the new dealers stand, where they can view the promised land and get an over-all picture, they can detect no inconsistency in the present downward movement in prices.

For one thing, when the President a year ago came out for higher prices, and even went off the gold standard to effect them, he meant prices of what the farmer sells, and not necessarily steel, lumber, cement and other commodities.

And, according to the "inside" story of the present adjustment in prices, business will eventually be found the winner. The "inside" story runs something like this.

The great need at the moment is to revive the building industry—an important component of the durable goods group. While the NHA provides an easier method of pumping money out, it needs to be complemented by lower material prices, and also lower wage costs.

Negotiations are on to obtain some concessions from the building trade unions. Lumber at a reduction of 10 per cent means an adjustment in other building materials. The depression of steel prices was a coincidence, but a helpful one.

The 15 per cent cut under code prices allowed on government bidding by executive order will result in a complete cycle of lower commodity prices. Industry should make up in volume what it surrenders on a unit basis.

Organized labor has been planning to concentrate on organization work this summer, following some victories, including a partial one on steel. Industry could have no greater defense than lower selling prices, and one of labor's fangs is drawn.

Hence the administration is attempting to put some impetus behind building, to pry the durable goods industries off dead center, hoping that the gains in this direction will more than offset the losses in others, and at the same time give industry a defense against labor and an answer to critics, such as the Darrow board.

There is one angle to this "inside" story that Washington will have to prove—that it can get building trades labor to make a contribution.

It will be recalled that the Bacon-Davis wage act permitted contractors on government work to pay wages less than the prevailing scale in their districts; in other words, to undercut high building trade rates. But just before he left, and after the order making the act effective was only ten days old, the President suspended it.

Whatever benefit will accrue to the iron and steel industry from the housing administration will be largely in small dribbles of warehouse products, and no tonnages of pipe, structural steel or reinforcing bars are now in prospect.

MORE conferences have been held between high officials of the steel industry and the government than have broken into print, and while some important concessions have been made, peace is nearer today than at any time under the new deal.

Whereas the automobile industry stood out for proportional representation of labor, steel has conceded the demand of the Amalgamated Association of Iron, Steel and Tin Workers for majority representation. If the contentions of steel producers that their plants are not highly unionized are well grounded, this concession is meaningless.

The personnel of the national steel labor board—Judge Stacy, Admiral Wiley and Mr. Mullenbach—was approved by leaders of the steel industry prior to the President's an-

nouncement. Superficially, Judge Stacy and Admiral Wiley would be regarded more pro-industry than pro-labor, while Mr. Mullenbach has been closer to the labor side, but apparently the word impartial is correctly applied.

To this group, the industry will have to disclose its payrolls, in event elections are ordered. From this standpoint the position of steel is better than that of automobile executives, who have to deal directly with a representative of organized labor. The actual working out of the automobile industry plan is that no election has been demanded or held, and Washington suspects that when labor won the right to elections it also lost the desire for them.

Two paradoxes have developed in regard to steel prices.

The new deal is openly the champion of the "little fellow." It happened to be the small mills that forced the $3 to $8 per ton increases for the third quarter, and it is the large corporations that led in the present reduction.

The leader of the present downward movement was the National Steel Corp., the corporation that stood up to NRA and resisted the encroachments of the now-defunct national labor board.

Incidentally, with Mr. Richberg definitely out of NRA—probably for all time—and acting this summer as a co-ordinator of all recovery activities, the steel code authority loses its second government member. K. M. Simpson, former division administrator, stepped out June 1.

FEW pieces of legislation ever put on the statute books have so far-reaching implications as the Frazier-Lemke act, pushed through congress the night prior to adjournment when the administration's plans were upset by Senator Bulkley of Ohio.

Briefly, if a farmer-debtor cannot persuade his creditor to scale down his mortgage he can have his farm appraised by an agent of a federal court. If this appraisal is not accepted by the creditor, the farmer may stay on the land 5 years, pay interest at only 1 per cent and a reasonable rent fixed by the federal agent. At the end of the 5-year period the farmer may elect to leave the land, without a deficiency judgment hanging over him, or he may force the creditor to accept the appraisal value minus the rent paid in the meantime.

A critic of the bill, which is more sweeping than any of the bankruptcy legislation thus far enacted, contends that the lenient terms are an admission that AAA and other agricultural remedies have failed. What Washington sees is the retention of the farmer on his land, and the release of what free money he has for the purchase and repair of his equipment. To the extent this is a true gage, the iron and steel industry may benefit from the purchase of fencing and implements.

The seventh state summary of farm housing conditions has been published by the department of agriculture. This tells about the condition of farm homes and buildings in the state of Arkansas. Of these buildings 26 per cent need new roofs and 34 per cent need roof repairs; 42 per cent need new screens and 21 per cent need screen repairs. These figures also give an approximate indication of needs in connection with foundations, wells, doors and windows, walls, ceilings, etc. There also are large needs in the forms of new wells, kitchen sinks, bathtubs, lamps, stoves, laundry facilities, refrigeration apparatus, etc.

Died:

HARRY W. TUEMLER, 51, in charge of sales of the Newport Rolling Mill Co., Newport, Ky., at

Harry L. McCauley

Milwaukee district manager for the Inland Steel Co., Chicago, who as noted in STEEL for July 2, died in Milwaukee, June 26, from drowning

his home in Covington, Ky., June 28. He had been connected with the company 32 years and was a leader in northern Kentucky civic affairs.

□ □ □

Frank A. Brewer, 79, president of the Duluth Crushed Stone Co., in Duluth, June 24.

□ □ □

E. P. Huhman, sales manager of the Imperial Belting Co., Chicago, in an automobile accident at Tulsa, Okla., June 27.

□ □ □

Robert D. O'Neil, 49, vice president and general manager, Vulcan Detinning Co., Neville Island, Pa., in Pittsburgh, July 1.

□ □ □

James T. Green, tool steel sales representative for the Chicago office of the Bethlehem Steel Co., in an automobile accident near Huntington, Ind., June 29.

□ □ □

H. C. Hanson, president and founder of the American Gas Machine Co., Albert Lea, Minn., near Romer, Minn., June 28, in an automobile accident.

Here and There In Industry

REPUBLIC STEEL CORP., Youngstown, O., has appointed Pidgeon-Thomas Iron Co., South Main and Iowa streets, Memphis, Tenn., distributor of its Enduro stainless steel.

□ □ □

Highway Steel Products Co., Chicago Heights, Ill., has opened a warehouse and office at 1042 Central Industrial avenue, St. Louis, in charge of E. D. Older.

□ □ □

McCormick Asbestos Co., 1400 Moreland avenue, Baltimore, has been appointed agent for the Mundet Cork Corp., 450 Seventh avenue, New York, for its insulating materials.

□ □ □

National Tank Co., Tulsa, Okla., has moved into its new warehouse and office at Houston, Tex. Floyd Senter is manager of the branch plant.

□ □ □

Climax Molybdenum Co., 295 Madison avenue, New York, has opened two additional branch offices, one at 310 South Michigan avenue, Chicago, in charge of E. R. Young, and one in the First National Bank building, Canton, O., in charge of Paul M. Snyder.

□ □ □

Pittsburgh Lectromelt Furnace Corp., Pittsburgh, has installed in the Ford Motor Co. building at the Century of Progress at Chicago a three-phase, 500-pound furnace which will be operated as part of the Ford exhibit. This is the first time an electric melting and refining furnace has been exhibited in actual operation, except at conventions of foundrymen.

□ □ □

Edward Valve & Mfg. Co. Inc., East Chicago, Ind., has appointed

(*Please turn to Page 72*)

Industrial Men in the Day's News

Frederick B. Heitkamp
Member of Executive Staff, Lyon Metal Products Inc.

For the past 13 years he has been active in sales work for a leading Cincinnati machine tool builder.

A specialist in merchandising, in his new capacity he will devote time to marketing and sales research.

Numerous papers on the subject have won him wide recognition for his knowledge of selling technique.

FREDERICK B. HEITKAMP, who as announced in STEEL for June 18 assumed new duties as a member of the executive staff of Lyon Metal Products Inc., Aurora, Ill., July 1, until the latter date was general sales manager of the Cincinnati Milling Machine Co. and Cincinnati Grinders Inc., Cincinnati, machine tool designers and builders.

He graduated from Rutgers university in 1917 and at the close of the World war became associated with the General Motors Export Co., New York. In 1921 he joined the Cincinnati Milling Machine Co. as assistant advertising manager. Since that time he has held positions of advertising manager, sales manager and general sales manager.

In his association with these Cincinnati companies he has given particular attention to merchandising and marketing methods and has become widely recognized for papers which he has presented before various associations, discussing sales technique, sales control and advertising.

He is a member of the American Management association, National Industrial Advertisers' association, sales executive council of the Cincinnati chamber of commerce and the Cincinnati Association of Industrial Marketers. He is an elder in the Mt. Auburn Presbyterian church of Cincinnati.

His associates in the Milling Machine company tendered him a farewell testimonial luncheon on Saturday, June 16, at the Cincinnati country club, presenting him with a wrist watch.

Lyon Metal Products Inc., where Mr. Heitkamp is now devoting his time to marketing and sales research problems, manufactures principally steel lockers, office furniture, metal card tables and chair, and store lockers and cabinets.

□ □ □

K. B. Bowman has been appointed general superintendent of the steel mill of Timken Steel & Tube Co., Canton, O. Graduated from Case School of Applied Science, Cleveland, in 1921, he immediately became associated with the steel industry. He has been with the Central Steel Co., Central Alloy Steel Co., and Republic Steel Corp., his experience covering metallurgical and operating practice. He joined the Timken company in 1931 as special statistician for the president, F. J. Griffiths. In 1933 he was made director of production, in which capacity he has acted until his recent appointment.

□ □ □

C. Leroy Hughes, safety and employment manager of the New Castle works of Carnegie Steel Co., was promoted to director of personnel and welfare work in the company's general offices in Pittsburgh, effective July 1. He has been in the employ of Carnegie since 1917.

□ □ □

Harry C. Morehouse has been appointed sales manager of the machinery division of Emsco Derrick & Equipment Co., Los Angeles, succeeding Charles D. Wagner who has been named vice president and manager of the D. & B. Pump & Supply Co., a division of Emsco.

□ □ □

Dr. Ancel St. John, St. John X-Ray Service Inc., Long Island City, N. Y., has been named head of the subcommittee on radiographic inspection of the boiler code committee of the American Society of Mechanical Engineers.

□ □ □

W. A. Rose, recently connected with the Chicago plant of the Stewart-Warner Corp., has been made vice president and general manager of the Bassick Co., Bridgeport, Conn., succeeding Leslie McArthur, resigned. The company is a subsidiary of Stewart-Warner.

□ □ □

Luther Becker, chief of the iron and steel division, bureau of foreign and domestic commerce, Washington, has been re-established in the Commerce building, that city, with headquarters in room 3835. Mr. Becker's, as well as other commodity divisions of the bureau temporarily occupied other quarters in order to make way for NRA.

A.S.M.E. Officers for 1935 Nominated

Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt., has been nominated president of the American Society of Mechanical Engineers for 1935. Nominations for officers were announced at a recent meeting of the society's nominating committee in Denver, during the semiannual meeting. Election will be held by letter ballot of the membership, closing on Sept. 25.

Other nominations are: Vice presidents—E. W. O'Brien, editor, *Southern Power Journal*, Atlanta, Ga.; James H. Herron, president, Jas. H. Herron Co., Cleveland; and H. R. Westcott, president, Westcott & Mapes Inc., New Haven, Conn.

Selections for managers: B. M. Brigman, dean, Speed Scientific school, University of Louisville, Louisville, Ky.; Alfred Iddles, vice president, United Engineers & Constructors Inc., Philadelphia; and Prof. J. W. Haney, University of Nebraska, Lincoln, Nebr.

Renew Wire Nail Standard

Simplified practice recommendation covering copper wire nails, effective Dec. 1, 1933, was reaffirmed without change as of July 1, by the division of simplified practice of the national bureau of standards.

EDITORIAL

Industry Should Voice Its Attitude on Pensions

IT IS practically certain that legislation dealing with pensions for industrial employes will be considered seriously in the next congress. Pressure for such laws was applied vigorously upon senators and representatives during the past session. The government administration is strongly in favor of pension laws. Only the rush of other problems prevented our legislators from writing an industrial pension act into the law of the land.

However, while pension legislation of sweeping character escaped enactment, congress passed and the President approved the railroad retirement act, under which annuities will be paid to all railroad employes attaining the age of 65 or completing 30 years of service.

Industrial executives should study the provisions of this act carefully, as it may represent the government's idea of a federal plan applicable to all industry.

The annuities will be paid from a fund to which employes contribute 2 per cent of their "active service" pay and the employers contribute twice this amount. As shown on pages 15 and 16 in last week's issue of STEEL, this plan, if adopted in the iron and steel industry, would mean that the fund would be enriched to the extent of about $1.20 per ton of steel ingots annually. Of this amount, 40 cents would come from employes' wages and 80 cents from company treasuries.

If Industry Does Not Voice Its Attitude, It Cannot Complain If Law Is Unjust

According to the railroad retirement act, the fund will be handled by a newly created bureau in Washington, and will be invested in government bonds.

With the warning furnished by the railroad pension plan, industry should lose no time in mapping a plan of action in regard to pension legislation for industrial employes. If the leaders of industry fail to speak out on this important problem, their silence will be interpreted by the public as lack of interest in or opposition to industrial pensions. Also, if industry's spokesmen neglect to express their views, they cannot justly complain if the government imposes a plan of its own choosing.

Moreover, continued silence or inactivity by industry will give the government administration a wonderful opportunity to lead the public into believing that the pension idea is part of the new deal. As a matter of fact, industry has had a wealth of experience with pension plans. In 1925, when the National Industrial Conference board published "Industrial Pensions in the United States," it was estimated that 248 pension plans were in operation by American industrial companies. Of these 21 were installed prior to 1910, 167 were introduced in the decade from 1910 to 1920 and the remaining plans were inaugurated from 1920 to 1925.

It is of interest that the metals group (including iron and steel) stood at the head of the industrial groups, with 60 pension plans in force. Public utilities ranked second with 47 and railroads third with 37. In the metals group, 702,625 employes were covered by pension plans and 8192 retired employes had become pensioners.

Experience of Industry Should Be Used in Formulating Federal Laws on Pensions

One of the difficulties under which the pioneers in industrial pensioning labored was the inequality resulting from initiative in adopting the pension idea. The companies which voluntarily introduced pension systems immediately incurred costs which placed them at a disadvantage with companies that refused to undertake such commitments. The enactment of conflicting pension laws by a number of states also complicated the problem.

Confusion of this kind, arising from lack of uniformity, is the principal argument for federal laws governing pensions. But, if the government is to write the legislation, it should utilize to the fullest extent the experience of industrial concerns which pioneered in the work.

Here is a typical case of a problem where industry, by taking the initiative now, while congress is not in session, can save itself the later embarrassment of being placed on the defensive.

Industry has a wonderful hand. If it plays its cards properly, it can hold public esteem on the pension question and can really assist congress to pass a law that will work much better than one dictated solely by politicians or social-minded theorists.

Retirement annuities are bound to become part of our national life. Industry should do its part in insuring equitable laws to govern them.

THE BUSINESS TREND

Artificialities Give Third Quarter Poor Start

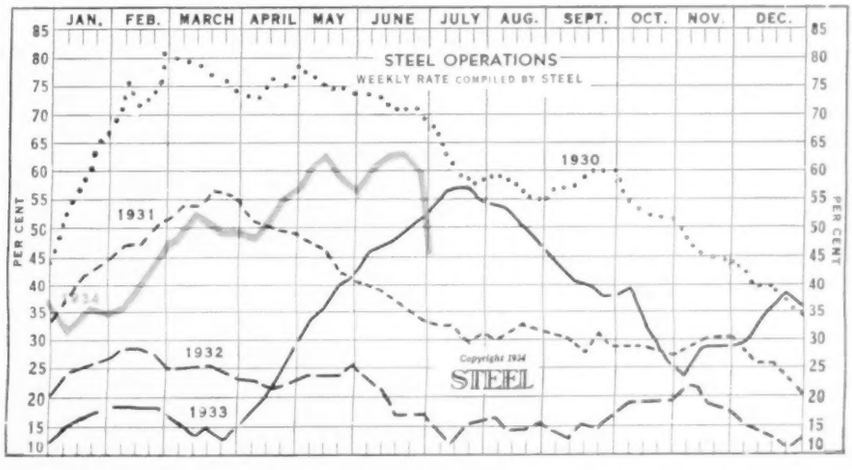
SHARP curtailment of operations in the iron and steel industry in the past week, coupled with recessions in all lines of business occasioned by the fact that Independence day fell in the middle of the week, tends to give the barometers of business an abnormal jolt at the beginning of the third quarter.

Because of the artificialities involved, this sudden precipitate drop has practically no value of an indicator of business trends. It will remain for the extent and character of the rebound from last week's lows to give the first hints as to the outlook for the third quarter. The very fact that two all-important industries—steel and automobile—stretched the idle period for July fourth to from three days to a week should assure resumption of activities at a higher rate than if only the one day had been lost.

One cannot speculate upon prospects for the next few months without taking into account the effect of the new price policy which has developed in the past few weeks. Automobile builders claim that their action in cutting prices has revived orders to a very gratifying extent. Whether the price reductions of the steel industry will bring about a similar reward remains to be seen.

Reversal of Price Policy May Bring Trouble Unless Adequate Control Is Retained

From the longer range view, the change in national policy from stimulating higher prices (the administration's goal was the 1926 level) to encouraging lower prices, through NRA's reversal of policy and President Roosevelt's curious act in permitting 15 per cent reductions on government work, has interesting possibilities. How far can the government toy with price policies without inviting the old cut-throat competition? Also, how much can prices be pared without jeopardizing the wages established under NRA sponsorship? The present trend is charged with dynamite, which will explode if price control is weakened too much.

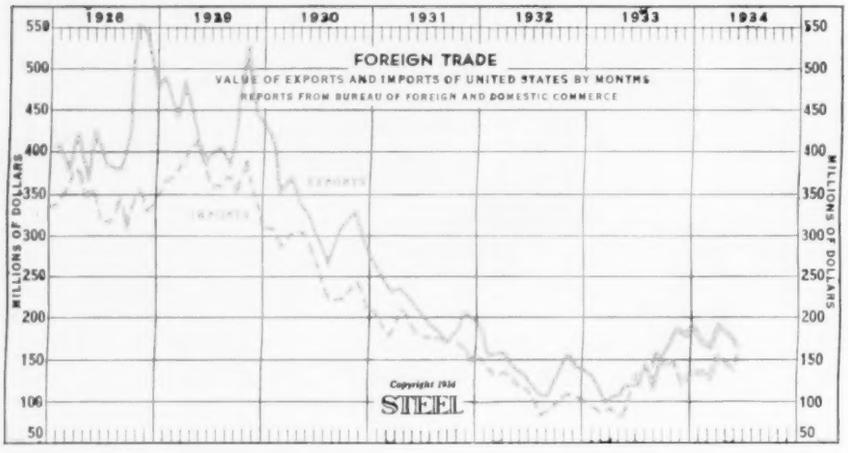


1934

June 30	46
June 23	59
June 16	62
June 9	62
June 2	60

1933

July 1	54
June 24	51
June 17	49
June 10	48
June 3	47



Exports	
May, 1933	$160,207,000
May, 1934	179,437,000
April, 1934	114,203,000

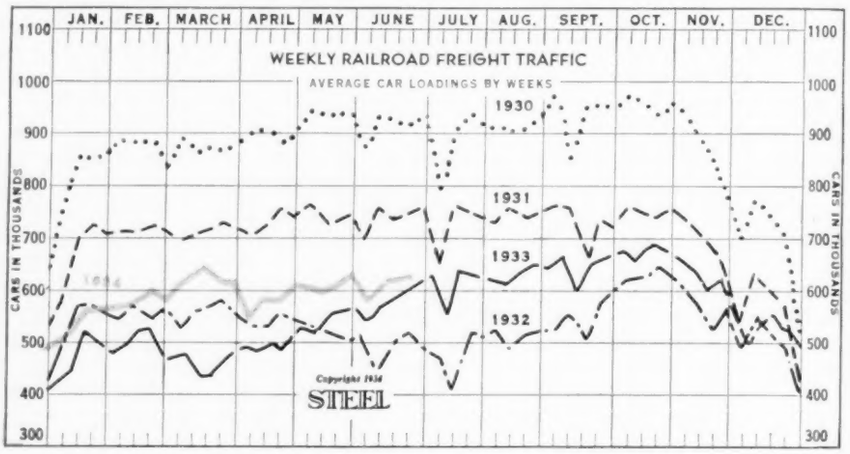
Imports	
May, 1933	$154,647,000
May, 1934	146,523,000
April, 1934	106,869,000

Foreign Merchandise Trade Down Sharply in May

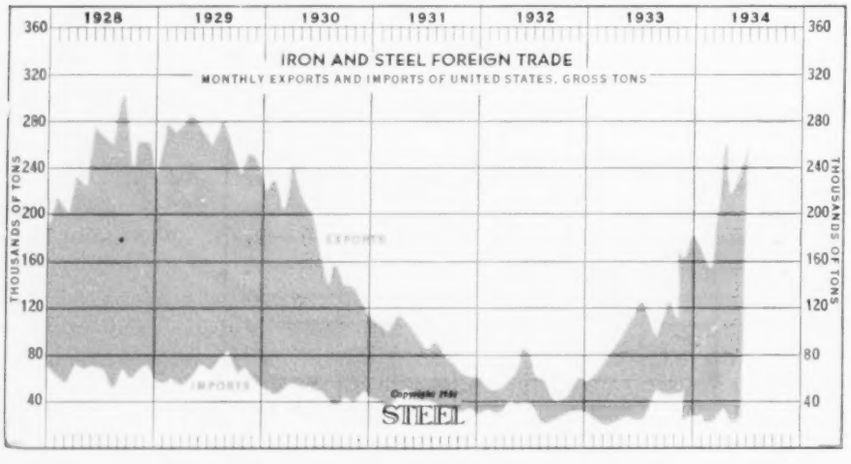
The foreign trade statement for May, issued by the department of commerce, shows another reduction in merchandise exports. The value of merchandise shipped during May was $160,207,000 and imports $154,647,000, the excess of exports for May this year being only $5,560,000. In April, exports were valued at $179,437,000 and imports $146,523,000, the trade balance amounting to $32,914,000. The increase in May exports over a year ago was 40.3 per cent, while in imports it amounted to 44.7 per cent.

Freight Traffic Continues Moderate Climb

Freight car loadings in the week ended June 23 totaled 621,872 cars, according to the weekly report of the American Railway association. This was an increase of 4223 cars over the preceding week, 12,245 cars over the movement in the like week of 1933 and a gain of 122,879 cars over the corresponding week of 1932. The increase in the week ending June 23 was slightly greater than the usual seasonal rise when compared with corresponding weeks over a period of the past 15 years.



	1934	1933
June 23	621,872	609,627
June 16	617,649	592,759
June 9	615,565	569,157

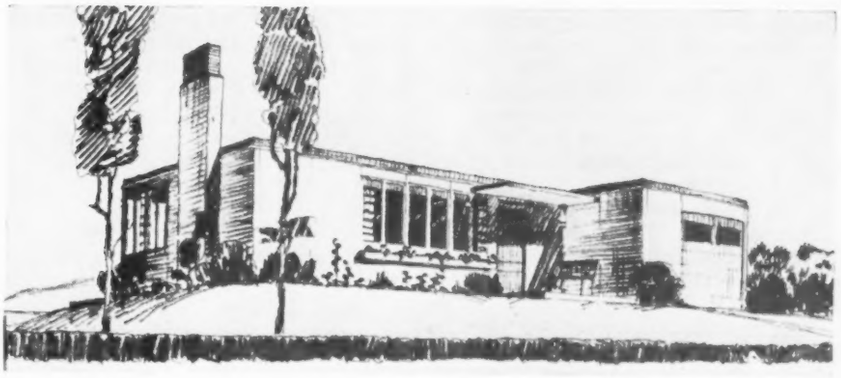


Exports	Tons
May, 1933	241,753
May 1934	201,539
April, 1934	123,069

Imports	Tons
May, 1933	29,465
May, 1934	26,862
April, 1934	26,295

May Iron and Steel Export Trade Up Sharply

United States export trade in iron and steel products registered a 20 per cent increase in May making up two thirds of the tonnage lost in April compared with March according to the iron and steel division of the department of commerce. Exports in May were 241,753 gross tons, compared with 201,539 tons in April and 123,069 tons in May, 1933. Imports in May were 29,465 tons against 26,862 tons in April, a rise of 9.7 per cent. Imports in May, 1933 totaled 26,295 tons.



Will the American public accept the prefabricated house of steel; or, will it ultimately prefer individual homes in which steel is the dominant material? This is a reproduction of an architect's drawing of a house exhibited at "A Century of Progress" by General Houses Inc. It is a good illustration of the current trend in "prefabricated" design.

TRENDS IN DEVELOPMENT OF STEEL HOUSES IN UNITED STATES

BY FRANK MAIN
Stran-Steel Corp.

THE term "steel house" has captured the attention of the public mind. It has aroused interest as has nothing else in the home building industry for two decades.

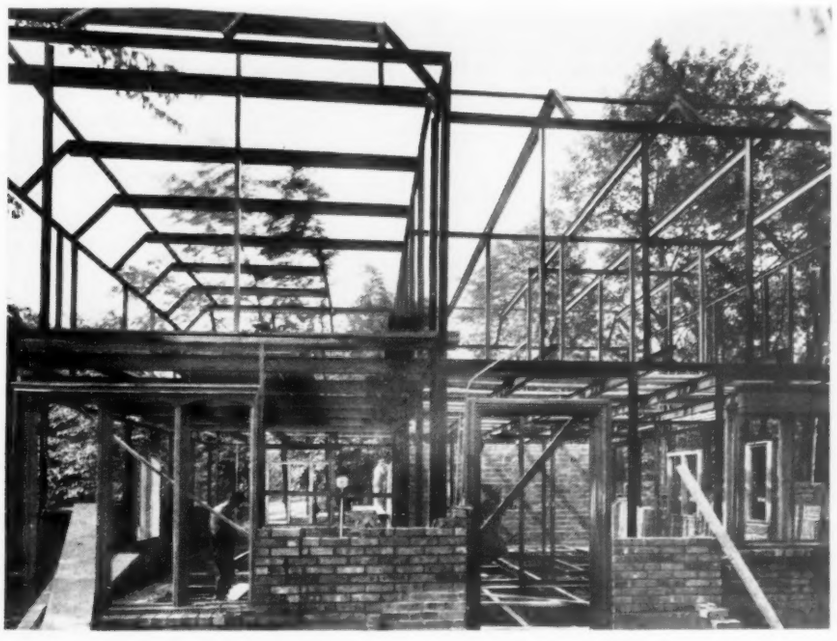
The efforts of men engaged in the steel house business follow two clearly defined lines. One is directed toward the design, fabrication and sale of complete houses. The other is directed toward the introduction of steel gradually into all houses. The first has not met with commercial success. That the second is gaining acceptance is witnessed by a steadily increasing volume of sales.

Those who are promoting complete, factory-built houses command a sensational type of publicity and thus tend to sustain public interest in the use of steel, without the promise of immediate sales. Those who plan to introduce steel in increasing amounts into buildings predict that public taste will finally come to accept a kind of housing which will permit further utilization of steel. Their activities attract less general attention, but the groundwork is being laid for profitable business.

Among those interested in the strictly factory-built house are the exponents of building entirely with sheet and strip steel. Since steel costs two and one-half times as much as lumber in our markets, it is their aim to reduce the total steel tonnage to a minimum and yet provide sufficient strength to support the structure permanently. They plan to take full advantage of the greater strength of steel over materials ordinarily in use, by making the envelope self-supporting and thus eliminate the framework.

There have been several ex-

From a paper presented, at the invitation of the American Institute of Steel Construction, before the Third International Congress for Steel Development, London, England, June 20-23, 1934. The author is vice president, Stran-Steel Corp., Detroit.



Many proponents of steel house development favor the gradual introduction of steel into house construction. The real pioneers were those who designed steel framing. The accompanying illustration shows a steel frame dwelling erected in 1931 according to the McKay system.

periments with cellular members in which panels are formed to standard dimensions. Field assembly usually is accomplished by welding or bolting. In one recent experiment a house was built in which the units were provided with overlapping flanges which were nailed together with drive-screws. Floor and roof panels are usually supported by lightweight, hot-rolled web joists, by joists cold rolled from sheet steel, or by latticed beams.

In general appearance these houses depart radically from accepted architecture. The living arrangements are frequently unconventional and the rooms, which are made as small and compact as possible, provide a maximum of livable space.

There are several systems of prefabricated houses which compromise in the use of materials. The practice is to employ steel framing and to attach to it standardized panels of nonferrous materials, which may be bolted or clipped in place. These structures have a marked cost advantage over the all-steel, frameless house.

In contrast with the promotion of prefabricated houses, we find the practical work of those who plan to fit light weight steel framing into houses of existing architecture. The use of steel for framing dwellings constructed of conventional collateral materials, is a compromise between the factory-fabricated house and the established practice of building. The aim is to establish an immediate profitable outlet for steel.

There are some satisfactory systems of steel framing which may be used to replace lumber. The oldest and best known are shop fabricated to a plan. Light weight, hot-rolled angles and channels are employed. These are bolted or welded together on the home site. Collateral sheathing materials are usually wired directly to the frame.

In some systems, the channel members forming the uprights or studding, as well as the joists and rafters are fabricated into open trusses. This reduces the weight in handling, but the factory labor or assembly usually offsets any savings in material. Popularity is growing for plate and cap members which are pierced with holes at convenient intervals to facilitate bolting the members together in the field.

Five Nailing Methods

The manufacturers of steel framing recognize the difficulties of applying collateral materials to steel. The most satisfactory low-cost method is by use of hammer and nails. Five of the systems which have been devised for nailing collateral materials to steel will be considered:

1. Steel members of light weight channels are placed back to back in spaced relation with a nailing strip of wood, nailable cement, or aerated concrete secured between them. The advantages claimed for this system are: It provides for two rows of nails in one member, thus securing both sides of the vertical joints of surfacing materials.

2. Two light-gage steel pieces of suitable shape are fastened back to back. They are spaced so that a nail may be driven between them. The opposed surfaces may be corrugated or roughed so as to supplement friction in holding the nail. The features emphasized in this system are: Any length and varying thicknesses of common nail may be used. A nail may be withdrawn and used again.

3. A flanged member is formed of steel which is thin enough to receive a special drive-screw. The screw is driven through the surfacing material and pierces the flange. The screw, which is harder than the member, threads its way into the steel. This method is said to permit several parallel rows of drive screws in one member.

4. A special power hammer is provided to drive nails through surfacing materials. When a nail makes contact with a steel member an electric circuit is closed and the entering end of the nail is securely welded to the member. It is maintained that this system permits the use of any structural steel members without special regard to thickness or design.

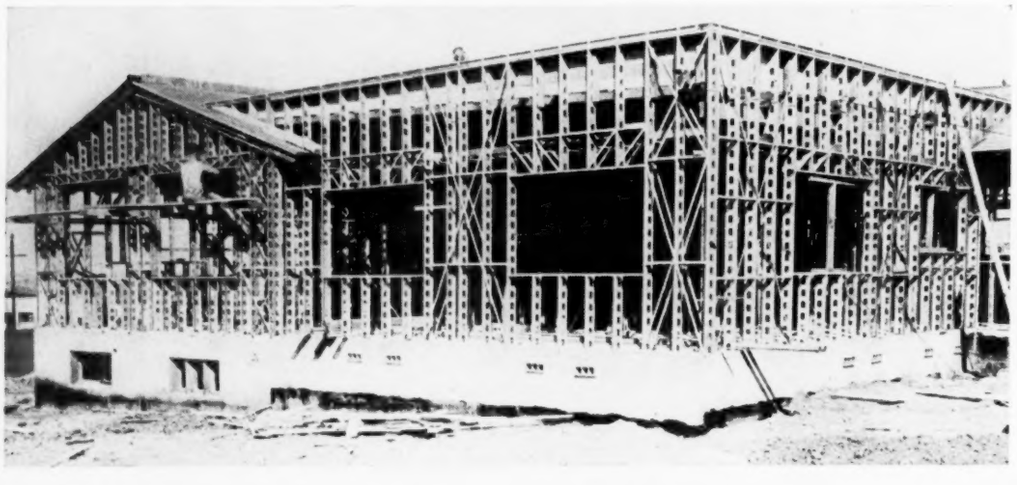
5. Two suitable light weight members are secured in back-to-back, spaced relation, the backs being corrugated in a sinuous manner so as to receive a nail and to bend it while it is being driven into the space. The advantages claimed for this system are: The nail is not held by friction but is actually clinched in place by laterally deforming it as it is driven into the nailing groove. Nails do not loosen with vibration, yet they may be withdrawn at will and new nails may be driven into the member.

Buildings erected by nailing to steel have given satisfaction over a term of years. The public acceptance of this method indicates that it is pointed in the right direction. Thus steel framing may be easily substituted for wood without modifications in architectural plans, and without changes in either the methods of building or in the other building materials.

When nailable steel framing comes into general use, architects and builders will plan construction to use as many standard lengths as possible. By performing its part in a better way than the material which it replaces, nailable steel framing can compete successfully in the building material market as soon as it is generally available.

Steel possesses many striking advantages as a home building material. Steel is a homogeneous, relatively inert material with a high strength-to-weight factor. It possesses enough elasticity and suitable ductility to be formed into structural framing. It is noninflammable. Its adaptability to use with other building materials, especially cement, is generally known. Its cost in volume is low. It has high salvage value.

The chief objections to the use of



Recently a tendency toward use of frame members of sheet steel has developed rapidly. This has accentuated the problem of fastenings, in which nails and drive screws have gained prominence. This building is of galvanized sheet steel frame members, bolted together—a design of W. C. Lea Inc.

steel as a house building material are worthy of review. It is said that steel is cold to the touch; therefore it will make a cold house. Since steel is subject to corrosion it is commonly supposed that houses built with steel will fall down. We are told that steel is noisy and will make a noisy house. We are informed that steel is heavy and is therefore difficult to handle.

It seems incredible to men trained in the manufacture of steel that this sort of misinformation about its usage should exist in the minds of men who buy food in steel cans, prepare it in steel utensils and eat it with steel knives and forks.

Education Is Needed

People need to be taught that warm houses can be built with steel. They should be told that steel is easily protected against rust. They must be shown that steel is no noisier than wood. They have to be taught that the steel framing of a house made of cold-rolled light gage sheet or strip is not heavy and is easy to handle.

The importance of educating the public to the great gains in security of investments, freedom from maintenance cost and safety for the family to be obtained through the use of steel in house construction cannot be overemphasized.

The fire-safety of steel as a house building material is of great importance to the public. Representatives of insurance companies have stated that when the volume of building of houses employing light steel frames is sufficient to warrant a special classification, substantial reductions in insurance premiums will be effected.

Steel framing can be easily adapted to existing styles of architecture. Architects must be informed that steel does not restrain their artistic expression and that it can be substituted in their specifications without changes in plans.

The truth about steel framing must be told to the building trades. Men in this work are conservative. They are jealous of their tools and materials. Any new material is subject to these difficulties. However, steel framing which can be laid out and built into houses by a widespread and powerful trade, such as the carpenters, meets with little obstruction. In communities where unions are not strongly organized, overcoming the resistance to new materials is a matter of education only.

The cost of steel framing for house construction has been subjected to thorough analysis. Steel costs two and one-half times as much as lumber. Therefore, the manufacturers of steel frames propose to employ as little steel as possible and to use it in that part of the house where it will accomplish the most good.

A shop fabricated house of sheet steel construction, utilizing **11** *tons of steel, and selling for* $2770. *Built by Universal House Corp.*

Nine Nations Participate in Third Congress for Steel Development

AN INTERNATIONAL congress for steel development was held in London from June 20 to 23 inclusive. The congress, the third of its kind, previous ones having been held in Paris and Dusseldorf, was under the auspices of the British Steelwork association. A number of representative members from similar organizations in Belgium, Czechoslovakia, France, Germany, Holland, Italy and Poland attended the congress.

Seventeen papers contributed by these associations were read and discussed during the sessions, which were held in the lecture room of the Institution of Civil Engineers. The program of papers follows:

"Building Regulations on the Use of Steel," L. G. Rucquoi, Belgium.

"Fireproofing of Steel Framed Structures," Van Genderen Stort, Holland.

"Rigid Frame Construction," Maier Leibnitz, Germany.

"Ductility of Steel," Prof. G. Magnel, Belgium.

"Factory and Other Utility Constructions," Prof. Ir. R. L. A. Schoemaker, Holland.

"Full Scale Tests on Steel Framed Structures," Dr. F. J. Baker, Great Britain.

"Steel Sheet Usage in Building Construction," Frank Main, United States of America.

"Slum Clearance Schemes Employing Steel Frame Construction," France.

"Working Class Flats at Rotterdam," T. Elshout, Holland.

"Architectural Use of Sheet Metal Products," F. Lorne, Great Britain.

"Designs for Palais des Expositions," L. Icre, France.

"Applications of Vierendeel Truss in Building Construction," P. C. Hausser, Great Britain.

"Steel Pit Props and Mine Arches," Great Britain.

"Welded Steel Frame Construction in Poland," Prof. Bryla, Poland.

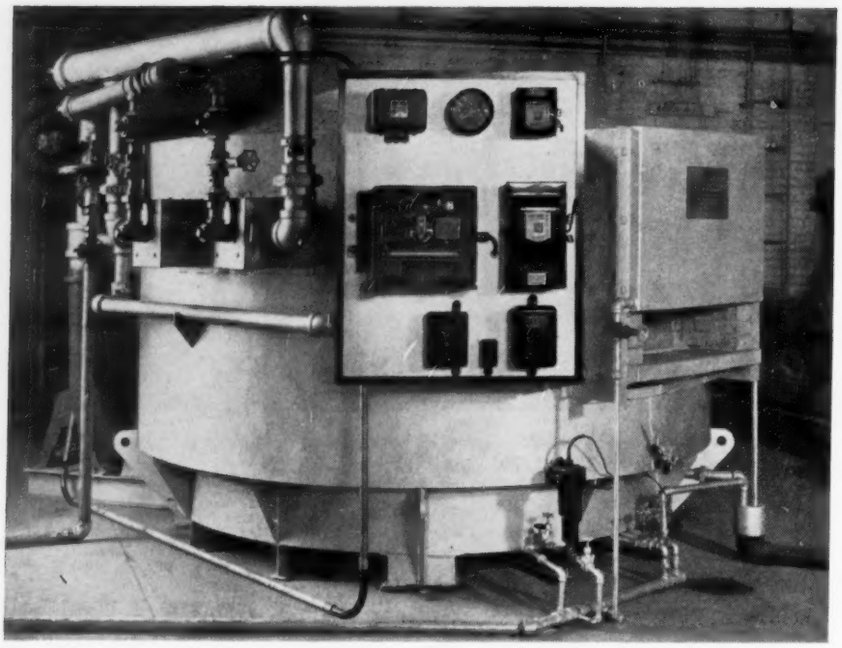
"Application of Welding to Railway Rolling Stock," A. Brandt, Poland.

"Types and Tendencies in Steel Bridge Design," T. C. Grisenthwaite, Great Britain.

"Long Span Bridges," R. Freeman, Great Britain.

The official banquet took place on Thursday, June 21, the principal guest being Dr. E. L. Burgin, parliamentary secretary to the Board of Trade, representing the Rt. Hon. Walter Runciman, president of the Board of Trade and congress patron.

The keynote of the speeches made during the banquet, and a point on which Dr. Burgin laid special emphasis, was that there is still an extremely wide scope for the use of steel in all the various activities of life and particularly in building construction. It was pointed out that while continental countries have made considerable advance in the use of constructional steel for buildings, bridges, etc., with large spans, Great Britain is restricted insofar as building is concerned by a number of rules and regulations which prevent the efficient use of steel as completely as its characteristics would make it possible. Reference was made to the scheme for building a large exhibition hall in Paris with a single span of not less than 250 meters (820 feet) and covering an area of 30 acres. A description of one of these schemes was published in STEEL of May 7. During the speeches regret was also expressed at the fact that it had been impossible for any American representative of the Steelwork Association to be present, but one paper was contributed from the United States by Frank Main (See p. 23).



This gas-fired, rotary-hearth forging furnace, equipped with water seal, circular flue and syphon vents, permits close control of furnace atmosphere to minimize scaling and surface decarburization. The unit is capable of heating 3500 pounds of steel per hour to forging temperature

Builds Improved Type Rotary Hearth Forging Furnace

TO MEET the growing demand for high-quality forgings with a minimum of scale and surface decarburization, which permit increased life and finishing to closer tolerances, the Gas Machinery Co., Cleveland, has developed an improved rotary forging furnace.

Much important research work, resulting in some very definite conclusions, has been done in connection with forging furnaces. One of the most important of these researches relates to furnace atmosphere. Properly controlled atmosphere regulates the scale and surface decarburization at each temperature. Another conclusion is that it is necessary to have uniform temperature control with as low a thermal head as possible.

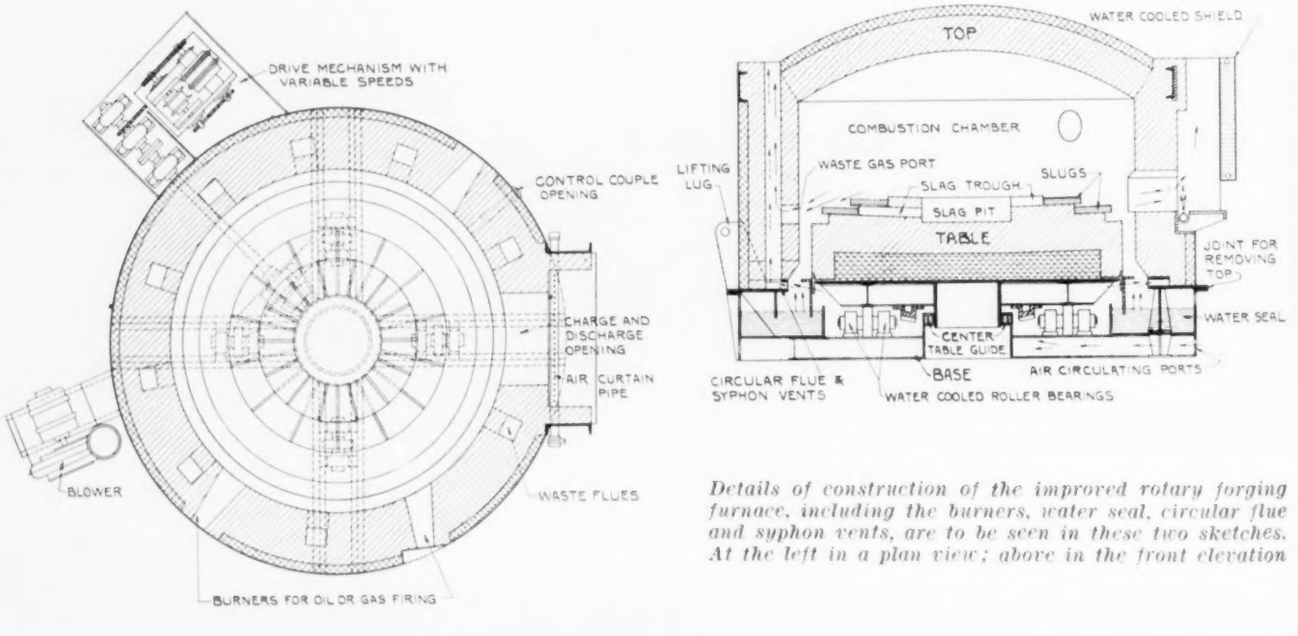
This rotary furnace, shown in the accompanying illustrations, is provided with a water trough in which a dam plate, fitted on the outer circumference of the rotating hearth, extends into the water, thus providing a positive seal and preventing infiltration of atmospheric air. Cooling water is circulated around the circular trough and any water vapors or infiltrated air are discharged to atmosphere with the waste gases from the furnace through the circular flue and syphon vents which are built into the side walls.

Suction from Waste Gases

The vents in the side walls are extended downward and connected to the circular flue. Waste gases leaving the furnace through the normal vents create a slight suction which is transmitted to the circular flue, thus drawing any water vapor or infiltrated air into the circular flue and discharging it to the atmosphere with the waste gases without entering the heating chamber.

Recent research combined with actual plant operation has shown that the most economical operation of a forge furnace is attained when a neutral furnace atmosphere is maintained. Tests have proved conclusively that a very large excess of carbon monoxide (CO) is required to reduce materially the scale from the amount formed at a given temperature and a neutral atmosphere.

(*Please turn to Page* 51)



Details of construction of the improved rotary forging furnace, including the burners, water seal, circular flue and syphon vents, are to be seen in these two sketches. At the left in a plan view; above in the front elevation

Making the Most *of* METHODS AND MATERIALS

Scored Crankshaft Salvaged By Metal Spraying

A drop forged steel crankshaft of an ice machine installed in an eastern manufacturing plant has become badly scored and grooved from corrosion and abrasion of the packing. The section, 18½ inches long and 4½ inches diameter, was several thousandths of an inch undersize. Salvaging of the shaft was undertaken by means of the oxyacetylene metal spraying process. The section was undercut 0.040-inch on the diameter, the undercut surface knurled and then lightly grit blasted. The next step was to build up the section with 18-8 chrome-nickel stainless steel to a diameter which was 0.020-inch oversize, the extra metal being provided for grinding which was the finishing operation. By building up with stainless steel, this expensive shaft was salvaged at a small fraction of the machining cost on the original shaft.

\$ \$ \$

Carbon Steel Parts Welded In Locomotive Building

Welding is being applied increasingly to locomotive joints. The tendency now is to weld joints of plain carbon steel in practically all parts of the locomotive excepting the longitudinal boiler seams. Customary practice involves both the oxyacetylene and electric arc methods, the former for cutting and preparing the steel and the latter for actually welding the joints. In the case of alloy steels, however, the oxyacetylene method usually is used throughout.

\$ \$ \$

Heavy Cuts at Slow Speeds For Machining Stainless

Chrome-nickel stainless steel of the 18-8 type can be machined without difficulty, but tools must be sharp and provided with ample rake and clearance. Heavy cuts at slow speeds will give better results than light cuts at high speeds. As the metal is hardened by cold working, it is important that the tool continue to cut from the start, otherwise difficulties may be encountered. The same general rules apply for threading as for other machining operations. A four or five-thread lead is advisable.

\$ \$ \$

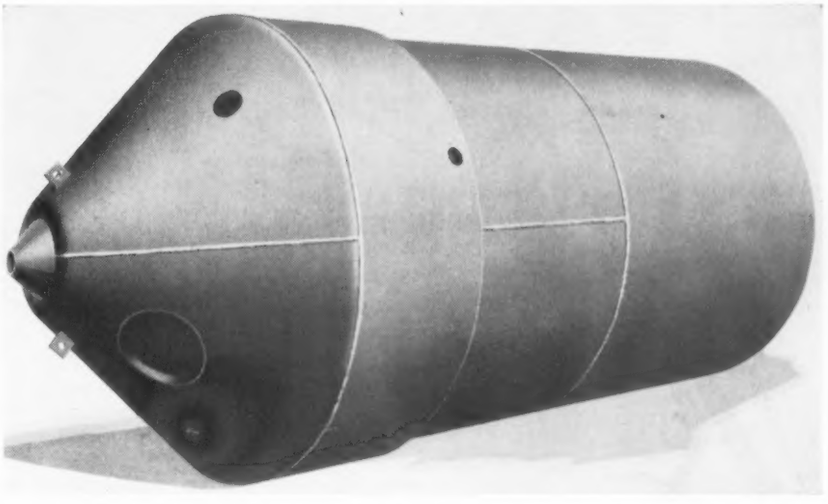
Heat Treated Cast Iron Now Finding Wide Usage

Among products now being made from heat treated cast iron and serving their purpose satisfactorily are underground cable brackets and clamps used in power distribution systems, machinery cams, connecting rods, conveyor chains, dies, gear racks, gears, differential carriers and universal housings for automobiles, and many other similar products. In addition to possessing more than ample shock resistance and elastic limit, these irons are said to be superior to steel in wearing qualities, stress dampening properties, fatigue resistance and machinability.

\$ \$ \$

23-Ton Rotor Ring of Nickel Steel Shows High Strength

A 23-ton rotor ring of nickel steel was cast recently in a German steelworks. Tests indicated a tensile strength of 90,000 pounds per square inch, a yield point of 51,000 pounds per square inch, an elongation of 22.5 per cent and a reduction of area of 41.9 per cent. The addition of nickel to steel castings is particularly beneficial where unusually large jobs are concerned, since it permits greater penetration of the



STAINLESS-CLAD STEEL FOR BLEACH TANK: Recently installed by a middlewestern soap manufacturer, this 20,000-pound capacity glycerin bleach tank is 6 feet in diameter and 13 feet long, with a water-jacketed conical bottom. Stainless-clad steel ¼-inch thick was used for the shell and bottom, and the same material ⅜-inch thick for the water jacket. Assembly was by welding, with all welds ground smooth. Jacket was tested to 50 pounds hydrostatic pressure. Steel was supplied by Ingersoll Steel & Disc Co., Chicago, a division of Borg-Warner Corp. The tank was fabricated by the Hamler Boiler & Tank Co., Chicago. Use of stainless-clad steel provides a corrosion-resistant interior at greater economy in material than if solid stainless steel had been specified

effects of heat treatment in heavy sections.

\$ \$ \$

Moisture Required in Fiber For Smooth Cutting

One of the demonstrators for a large turret lathe builder found that in a certain large manufacturing plant the best operators were unable to cut clean threads on a fiber part. A die head was used, but the threads were ragged. Chasers were reground and various lubricants were tried, but to no avail. The solution came when an inquiring operator found that the fiber was stored in a stockroom where it dried out quickly. The material was placed outdoors overnight so that it would gather moisture. This treatment proved successful; thereafter perfect threads were cut with ease.

\$ \$ \$

Salve Checks Dermatitis

A company in the Middle West has introduced a compound for preventing and checking occupational dermatitis, (a skin affliction) resulting from various cooling lubricants, compounds, chemicals, alkalies, caustics, and the like. The material is a protecting and cleansing cream containing, with its other ingredients, sulphothysolium.

\$ \$ \$

Alloy cast irons with tensile strengths up to 100,000 pounds per square inch have been obtained with 8-10 per cent elongation and 225 brinell hardness. Such alloys have great depth of hardness and resistance to acid corrosion. A special alloy containing 4.5 per cent nickel and 1.5 per cent chromium produced a brinell hardness of 650 and outwore a 13 per cent manganese steel.

Reclaims Flasks by Welding

An automotive piston manufacturer found oxyacetylene bronze welding to be economical for reclaiming its cast-iron flasks. Six-mold flasks costing about a dollar are employed; they are small, rather fragile and break easily; thus at first it seemed inadvisable to repair them. However, investigation proved that an operator could reclaim 150 a day at an average cost of 8 cents each.

Porcelain Enamel Group In Educational Program

An educational bureau which will promote technical and market research, advertising and industry contact for the porcelain enamel and kindred industries is being organized by the Porcelain Enamel institute, Chicago. E. L. Lasier, Titanium Alloy Mfg. Co., Niagara Falls, N. Y., is chairman of the bureau.

The bureau will consist of four divisions: (1) Market research; (2) technical research—Richard H. Turk, Porcelain Enamel & Mfg. Co., Baltimore, chairman; (3) advertising and sales promotion—R. A. Weaver, Ferro Enamel Corp., Cleveland, chairman and H. Dana Chase, Chicago Vitreous Enamel Product Co., Cicero, Ill., vice chairman; and (4) industry contact—Bennett Chapple, American Rolling Mill Co., Middleown, O., chairman. A chairman for the market research section and various vice chairmen will be announced later.

Customers Are 900 Industries

As outlined by Mr. Lasier, the market research section will be concerned mainly with statistical data concerning potential customers. "Such customers," he points out, "might be entire industries. When one considers that over 900 codes for as many different industries were submitted to Washington for approval under NRA, one is forced to change his former conception of industry classification, and it appears that we will be delinquent if we as an industry do not survey the over 900 or so industries to see what new ones can be users of porcelain enamel."

The technical research section will attempt to establish standard forms, test methods, etc.; undertake to solve some of the fundamental scientific problems facing the manufacturer and user of porcelain enamel, and work closely with the market research section.

The advertising and sales promotion section will use such funds as can be made available in a co-ordinated, well-balanced program of advertising and sales promotion. The industry contact section will be responsible for all industry service, advertising and promotion "not involving radio or printed advertising." The Porcelain Enamel Parade at A Century of Progress and the recent contact work with the American Institute of Architects are typical of what will be done.

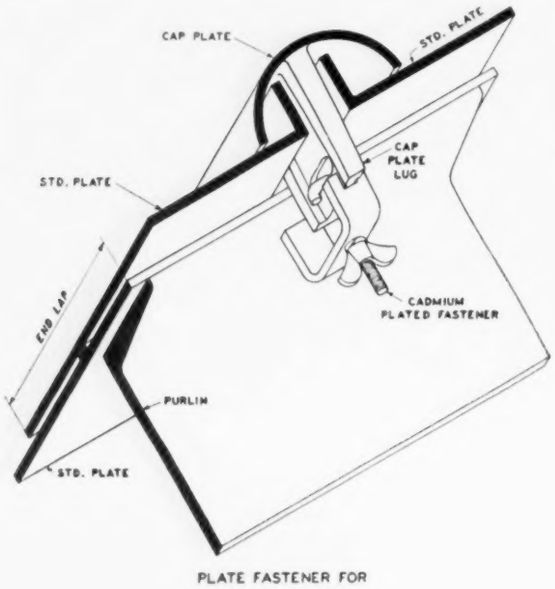


PLATE FASTENER FOR CHANNEL PURLINS WITH FLANGES UP SLOPE

PAT. PENDING

Cast Iron Plate Roof Employs Improved Fastening Device

A ROOF of cast iron plates has just been completed by the United States Pipe & Foundry Co., Burlington, N. J., on a 50 x 180-foot building of a large chemical manufacturing company in New Jersey. This "Usicast" roof installation is slightly different from an earlier one described on page 38 of the July 30, 1931, issue of STEEL, in that cadmium-plated hook bolts with wing nuts have been substituted for keys to lock the cast roof plates and cap plates to the purlins. The improved design as announced in the June issue of *The U. S. Piper*, is shown in the accompanying illustration. This arrangement applies when the flanges of the purlin extend up slope.

When it is desired to lock the roof plates to a channel purlin with flanges facing down slope, a longer cadmium-plated hook bolt is used, which engages a steel strap hooked onto the lower flange of the purlin.

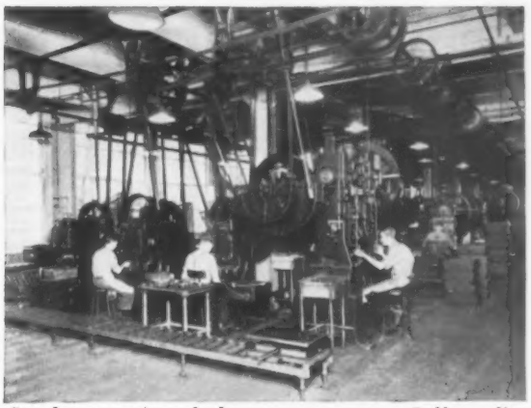
PRECISION . . . SPEED AND EFFICIENCY WITH GULF PRODUCTS AT GREAT N. C. R. PLANT

High Speed Automatic Machines Safeguarded with Gulf Lubricants and Gulf Cutting Oils

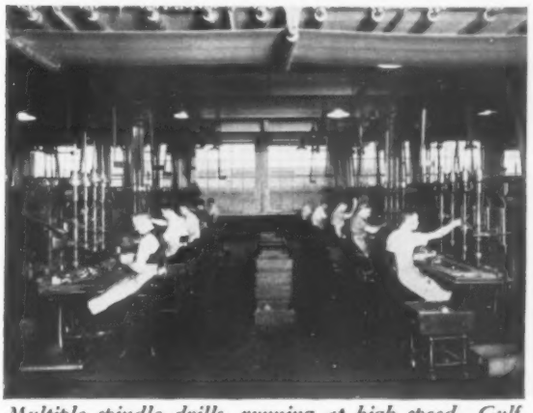
PRECISION is *vital* in the operation of the high speed automatic machines in the National Cash Register plant at Dayton, Ohio.

This great plant represents the ultimate in efficient plant operation. Accuracy, efficiency and practical attainment are in evidence in all departments.

N. C. R. protects its great investment in precision machinery with Gulf quality lubricants and cutting oils. Your plant, too, can be operated more efficiently and economically with Gulf products.

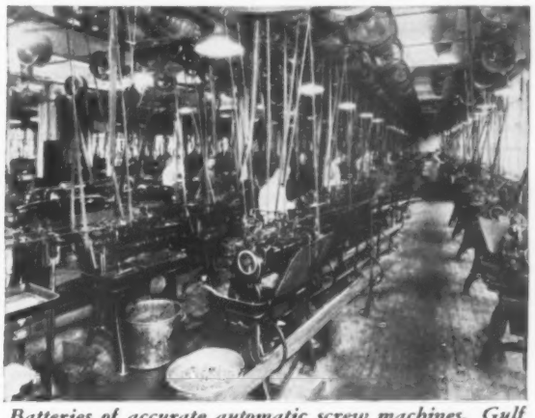


In the operation of these power presses Gulf quality products are an important factor. Continuous production is assured by the use of scientifically selected lubricants.



Multiple spindle drills, running at high speed. Gulf lubricants and engineering service insure the smooth, continuous operation of these machines.

Aerial view of the National Cash Register Company's world famous plant at Dayton, Ohio



Batteries of accurate automatic screw machines. Gulf quality cutting oils insure precision in operation, fine cutting finish and maximum tool life.

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Brittleness in Chrome Steel Still Tubes Investigated

A FEATURE of the annual meeting of the American Society for Testing Materials in Atlantic City, N. J., recently (STEEL, July 2, p. 40), was a discussion by E. S. Dixon, holder of the patents covering the well-known 4 to 6 per cent chromium steel still tubes, and metallurgist for the Texas Co., Port Arthur, Tex. He gave the results of four years of experience with such steel, containing only 4 to 6 chrome, and no additions of tungsten or molybdenum.

His study covered 10 batteries at Port Arthur, which contain altogether 670 tons of 4 to 6 per cent chrome steel tubes, 70 per cent of which are 5 inches in diameter, 30 feet long and have ½-inch wall thickness, while 30 per cent are 5-inch diameter, 30 feet long and have ¾-inch wall thickness. The outlet temperature of the oil is 900 degrees Fahr., and the outlet pressure is 450 pounds per square inch. Maximum metal temperature at the end of a run is 1300 degrees Fahr. Maximum pressure inside the tubes is 600 pounds per square inch. The batteries operate on a cycle, being cleaned at the end of each down period with a mechanical knocker for removing coke from the tubes.

Corrosion Is No Problem

Mr. Dixon said that the corrosion during the four-year experience has proceeded slowly and is not a problem. The only failures during the first two years were so-called "hot" failures, which occurred in operation. These hot failures always were preceded by swelling of the tubes, thus giving ample warning of an impending failure. In the past two years, in addition to the hot failures, there have been cold failures. That is, the tubes are split, during the down period, by the action of the knocker.

These failures, due to brittleness, led to an extensive investigation. Mr. Dixon showed a table which proved that the physical characteristics of the brittle. tubes, including tensile strength, elongation and reduction of area, were good. Charpy V-notch impact test results revealed the brittleness.

A further table was introduced to show results obtained under standard tests to determine temper brittleness. Figures showed that carbon steel is not temper brittle; 4 to 6 per cent chrome steel is temper brittle; 4 to 6 chrome steel containing molybdenum is not temper brittle; 4 to 6 chrome steel containing tungsten is somewhat temper brittle.

Unlike ordinary steel, Mr. Dixon pointed out 4 to 6 chrome steel does not work harden. This steel, in aging, shows no change in physicals other than loss of impact value. Too, time is a factor in making this steel brittle. Whereas the usual temper brittleness does not depend on time as a factor, this steel shows no brittleness until two years have elapsed. It was the belief that Mr. Dixon's findings will have an important bearing on the metallurgy of the oil refining industry in the future.

The report of the joint research committee on effect of temperature on the properties of metals was submitted by H. J. French, International Nickel Co. Inc., New York. Activities during the past year included work on slight revisions of the tentative test codes for short-time high temperature tensile testing and for long-time or "creep" testing, indicating that the committee takes the attitude that such codes require constant improvement and clarification on the basis of new information and of experience with their use.

A major activity of the committee was the extensive study it sponsored on tensile, fatigue and creep properties of 18-8 stainless steel of two carbon contents, each composition being studied as split heats, part of each heat being made into castings and part in wrought material. This work will be reported in detail in the July issue of the Transactions of the American Society of Mechanical Engineers.

A special subcommittee representing oil refiners, tube makers and the joint committee, is preparing a plant and laboratory program for study of still tube materials. The carrying out of this program as it will be worked out by the subcommittee is, of course, dependent on its financing.

Expand Work on Creep Tests

Additional projects bearing on the more fundamental work of the committee—work of a broader and less specilized nature than that of the still tube subcommittee — were brought to a more definite stage. Among these is the procurement and distribution of a carbon steel carefully checked as to uniformity, which laboratories may use for better comparison of their short-time and creep results. Another is the drawing up of a plan, to be submitted to letter ballot of the committee, which, in case of approval, will result in starting of experiments at an early date for creep tests on one or more materials, at one or more temperatures, the tests to be carried out for at least 20,000 hours. This is to establish the relationship between the curves so obtained and the extrapolations of shorter tests of, say, 1000 hours, or of the various so-called "accelerated" tests.

An extension of the previous work on 18-8 also was authorized, aimed to throw light on the experimental fact that one lot used, although containing no "stabilizing" element was found not to be embrittled after sojourn at elevated temperature under load for 1000 or 1500 hours. The question of whether it passed through a brittle stage, without any perturbation of the creep curve to evidence it, and subsequently recovered, will be examined.

A subcommittee on effect of temperature on metal-to-metal wear, covering such phenomena as seizure, as encountered in valves operating at high temperatures, has made a preliminary study of the problem and will proceed to a further study, in the hope of supplementing the present empirical knowledge by a more fundamental understanding.

A new subcommittee, on effect of sub-zero temperatures, is to be appointed to correlate and present data which many of the committee members are securing as a result of the interest of the oil industry in steels most suitable for use at the low temperatures of some modern de-waxing processes.

Tube Properties Considered

An important milestone in the development of heat treatment control in connection with 5 per cent chrome steel still tubes containing ½ per cent molybdenum was marked by a joint paper discussing the creep properties of such tubes. This was submitted by Howard W. Cross, Battelle Memorial institute, Columbus, O., the joint effort of Mr. Cross and E. R. Johnson, Republic Steel Corp., Massillon, O.

Increase in carbon content from 0.139 to 0.181 per cent in a 4 to 6 per cent chrome, ½ per cent molybdenum steel increased the physical properties and creep resistance materially, this paper showed.

Longitudinal material showed better creep resistance than transverse material of either carbon content, but the differences were less than 10 per cent. Better creep properties were obtained from slow-cooled materials as compared with normalized materials. Uniform structures with well defined grain were obtained by slow cooling, but normalized and reheated materials of comparable hardness showed less uniform structure.

Impact resistance of transverse material, the authors showed, was lower than for longitudinal material. Impact tests made on specimens sub-

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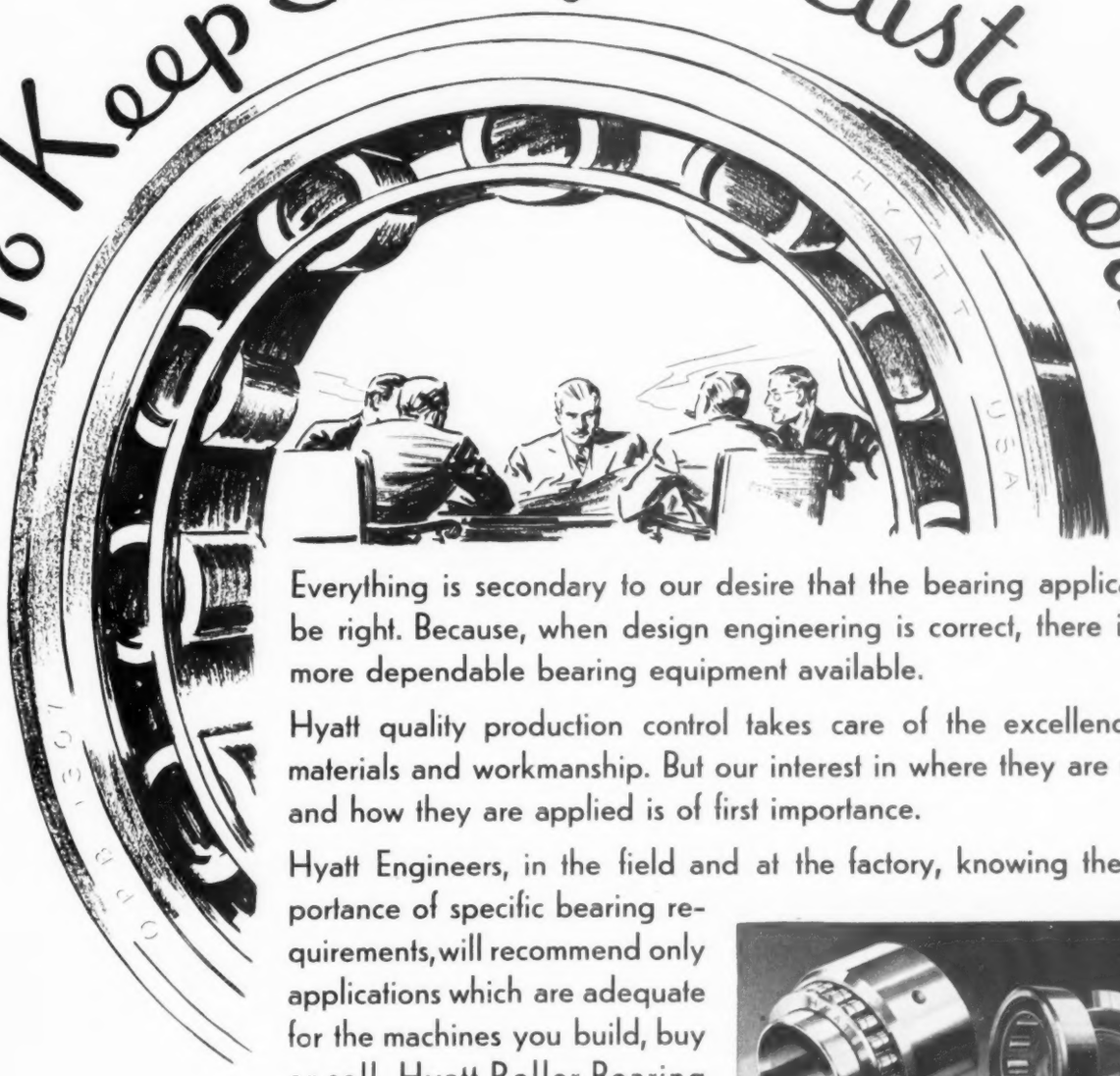

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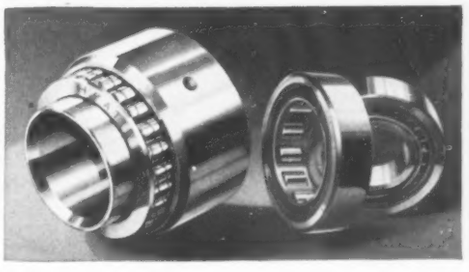

HYATT

ROLLER BEARINGS

PRODUCT OF GENERAL MOTORS

jected to load and temperature for 1000 hours or more revealed no notable drop in toughness. With some of the structures resulting from initial heat treatment, slight reduction was noted, but even in these cases a large measure of toughness remained.

Dr. H. F. Moore, University of Illinois, Urbana, Ill., reported that the research committee on fatigue of metals has asked one of its members to draw up a preliminary statement of practice for rotating-beam fatigue tests, and plans to consider this question of recommended test methods with such a proposed outline of recommended practice before it as an example. The main desire at this time is to provide a basis which will make possible the comparison of the work which is being done by different laboratories.

Also, Dr. Moore reported, several members of the committee are carrying on tests to determine a "damage line" for different metals. "Damage" in this sense is measured by the reduction of endurance limit of metal subjected to a given combination of stress and number of cycles below the endurance limit of the virgin metals. That is, it locates combinations of stress and number of cycles below which no apparent damage is done to a given metal.

P. G. McVetty, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., submitted a paper on the interpretation of creep tests. His discussion was aimed at the design engineers who are confronted with the need for specifying metals that will meet operating requirements under high temperatures.

Revise Metallographic Tests

Committtee E 4 on metallography reported that its subcommittee 1 has drafted a proposed revision of the standard methods of metallographic testing of iron and steel, and also of the methods of metallographic testing of nonferrous metals and alloys. This committee is preparing to appoint a subcommittee to study structure and grain size of tool steels.

W. H. Swanger, national bureau of standards, Washington, submitted a paper describing expansion fits. Where is it not practicable or permissible to heat a ring, for instance, which ordinarily would be shrunk on a pin, a reverse method is employed. The pin may be contracted by cooling and inserted into the ring, which will grip the pin tightly, and occasionally seize, when the pin comes back to normal temperature. By adding dry ice to a bath of acetone, metal may be cooled down to 70 to 80 degrees below zero Cent. Discussion revealed that the Aluminum Co. of America already uses this method in making joints in aluminum flagpoles and other structures.

R. F. Passano, American Rolling Mill Co., Middletown, O., spoke extemporaneously on the reports of tests of coated steel sheets, wire and hardware, conducted by subcommittee 8 of committee A 5. These coated products were exposed in five locations some years ago and Mr. Passano at this meeting expressed certain important conclusions as a result of observing these materials to date.

Equal weights of zinc coating, he said, give equal protection, irrespective of the method by which the coatings are applied. Increase in the weight of the coating increases the life of coating. Composition of the base metal does not influence the life of the coating. The amount of coating required for a given amount of protection varies according to the location, as some locations exert a more corrosive action than others. Weight for weight, zinc gives more protection than cadmium. Both zinc and cadmium give better protection than chrome-nickel-copper coating, even allowing for the fact that coatings of the latter type are usually assisted considerably by cleaning and polishing of the coated product.

New Stainless Specifications

Committee A 5 expects before the end of this year to prepare recommended tentative specifications covering corrosion-resisting sheet products for various fabricating purposes. Also, specifications for corrosion-resisting castings now are in the course of preparation. Specifications for corrosion-resisting bars and forgings also are being planned. A round-table discussion is to be held by this committee at Philadelphia next March to deal with difficulties in the fabrication of these alloys.

Committee A 10 submitted for publication the tentative specifications for welded corrosion-resistant articles made from austenitic chrome-nickel steel. This committee preprinted a report on "Polishing and Etching of Iron-Chromium Nickel Alloys," but decided to hold this matter over until a later date.

K. H. Logan, national bureau of standards, Washington, submitted a paper on the "Use of Bureau of Standards Soil Corrosion Data in the Design and Protection of Pipe Lines." He warned that the solution of the problem of economically reducing such corrosion is incomplete, and that the bureau does not believe that the study has been advanced to a stage at which sound conclusions can be drawn. He intimated that existing ideas as to pipe protection probably will have to be revised. It appears that asphalt coatings on pipe enable the pipe to form a protective film of its own, so that as the asphalt loses its effectiveness as a protective coating, the pipe is found to be free of the pitting which characterizes uncoated pipe placed underground.

Mr. Logan mentioned cases where even cast iron pipe seems to have been completely corroded in soil, and yet the pipe line stays open, evidently being supported by walls made up of the products of corrosion. In the discussion on this paper it was stated that there is little variation in the soil-corrosion resistance of such materials as steel, wrought iron, cast iron and stainless steel. Even stainless steel, under the attack of soil, shows pitting. But it was made clear that reports of soil corrosion are exaggerated. It was said that less than 10 per cent of the pipe placed underground needs protection. This is due to the different effects of soils.

L. J. Waldron and E. C. Groesbeck, national bureau of standards, submitted a report of a test to determine whether a film of oxide on the surface of steel prolongs the life of the steel when immersed in water. It was found such a film does not have any marked influence on corrosion losses at low velocities of flow of the water but that it has a noticeable effect at relatively high velocities.

A feature of the report of committee B 4 was a revelation of the importance of the results that have been made possible by this committee's activities in setting up a test-method, eight years ago, to determine the life of electrical heater wire. Because of the results obtained by such tests, it has been possible to locate and eliminate defects in heater wire, so that now the life of heater wire in service is five to six times that of eight years ago. The committee now is attempting to develop a shorter test method.

This committee recommended that two tentative specifications be adopted as standards: One covers drawn or rolled alloy, 80 per cent nickel, 20 chromium; the other 60 nickel, 15 chromium, and balance iron. Both cover electrical heating elements. It also was recommended that the tentative method of test for determining the temperature-resistance constants of resistance alloys be adopted as standard.

Salesmen Carry Samples in Streamlined Trailers

A new method for the display and sale of steel products has been instituted by the J. E. Burke Co., Fond du Lac, Wis., manufacturer of playground equipment and steel furniture. The plan, developed by officials of the company as the result of a sales campaign designed to submit samples of the company's products quickly and economically to a customer's door for examination before buying, resulted in the purchase of a fleet of nine Curtiss aerocars—light, commodious semi-trailers which are attached to automobiles driven by sales representatives of the company.

Seven of these trailers are now being operated in eastern and middle western states. Economy is aided by light weight, airplane-type construction. They are built by the Curtiss Aerocar Co., Coral Gables, Fla.

PROGRESS IN STEELMAKING

HEAVY deposition of oil in mains through which blast furnace gas is conducted to the boilers at a plant in Germany was traced to the smelting of rolling mill scale, the oil contained in this material being identical with that deposited by the gas.

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Radical changes in the manufacture of precision spring scales have been effected as a result of the recent development of a new spring material. The metal contains chromium, nickel and iron; and, silicon, molybdenum and other elements to provide greater precipitation hardness. Excellent elastic properties are obtained by cold working and afterheating.

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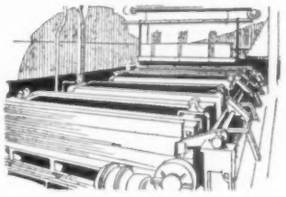
Impact strength improvement is an important effect of adding zirconium to steel. Zirconium is one of the most powerful deoxidizing agents known and inclusions resulting from deoxidation are either eliminated or dispersed in such manner as to be harmless to the steel. While it is not a cure-all, its increasing use in the production of certain alloy steels has indicated that in many cases the extra expense involved has been more than offset by increased mill yields due to lower rolling and forging rejections, as well as by the improvement in the uniformity of the final product. Greatest improvement of impact values from its use has been noted in steels containing from 1 to 2 per cent of manganese where the carbon is below 1 per cent. Alloy additions can be made conveniently in the form of silicon-zirconium or zirconium-ferrosilicon.



NEARLY 100 pickling tanks constructed of steel plates and lined with rubber and brick have been placed in operation in this country during the past four years for cleaning various iron and steel commodities. No leakage or shutdown for repairs are reported; application of acid-resisting paint to the exterior surfaces periodically has been the only maintenance work required.

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Speeding up the shearing of sheets and black plate is afforded by a new power shear built with a back gage which is operated from the front of the unit. Other features of the machine include an upper blade with a low-cutting angle and a high-pressure hold-down member.

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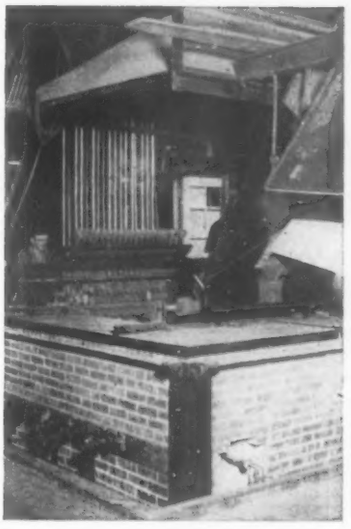
Reducing the amount of splash metal, which adheres to the sides of molds during the pouring operation, is effected, according to a designer of molds, by coating the interior walls with a graphite wash when high-carbon or alloy steel ingots are to be



teemed. Boiled tar is recommended for coating molds when low and medium-carbon heats are to be poured. The molds in either case should be at a temperature of 250 to 300 degrees Fahr. when the coating is applied.

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Savings of 20 per cent in the cost of materials charged in basic open-hearth furnaces have been effected in Germany through the use of high-manganese ore. By employing 50 per cent manganese ore in the charge, the percentage of manganese in the bath is as high as when 5.6 per cent manganese pig iron is charged. This reduction is best effected by having in excess of 1 per cent carbon in the bath after the melt down. The more manganese ore charged, the higher should be the percentage of carbon in the bath.

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Plans are being formulated by a maker of cold drawn bars to mark its stock to indicate the analysis of the steel. The designation would be in the form of a stamped or rolled imprint, rather than color-painting the ends of the bars, as is widely used in this country.

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Chrome base refractory cement, which is claimed to withstand temperatures up to 3335 degrees Fahr. without expanding, has been introduced. Highly resistant to chemical reactions the newly marketed product is said to be impervious to the attack of most slags, to resist fusible coal ash and other fluxing ingredients in fuels, to retard erosive and corrosive actions and to prevent the penetration of molten metal. Recent tests demonstrate it to be adaptable to patching work, for making

furnace hearths and for other monolithic refractory construction. The material can be used with fire-clay, high-alumina, silica, chrome, magnesite and insulating brick in all types of boiler and industrial furnaces where temperatures are fairly high and chemical reactions occur.

Copper Mold Stool Inserts Afford Quick Dissipation of Heat

EXPERIMENTAL results on the application of copper molds for casting steel ingots have not been encouraging from the standpoint of mold life. Copper castings, particularly for large solid molds, are difficult to make because the casting shows a tendency toward cracking. These initial cracks are detrimental to mold life inasmuch as they cause premature failure of the mold. A technique may be developed to overcome this condition but the cost of manufacture necessarily will be higher than that of making cast-iron molds.

Copper molds that have been made successfully show a tendency to warp during usage. This warping not only makes stripping difficult but produces cracks in the mold which cause ultimate failure. Reports so far do not indicate that copper molds have shown any longer life than cast-iron molds under similar working conditions.

Experimental work to determine whether copper molds have produced any change on the ingot quality has not been carried on sufficiently long to obtain definite results.

While copper ingot molds have not gained wide favor, there seems to be a definite field for the use of copper in mold stools and inserts upon which the molten steel is cast. The high coefficient of heat conductivity of copper conducts the heat from the steel so rapidly through the copper that its temperature remains low even though the temperature of the steel is from 800 to 1000 degrees Fahr. above its melting point. This property makes it impossible for the molten stream of steel from the nozzle to weld to the copper stool providing contact with it does not cover too long a period. In other words, if a pool of metal is formed quickly enough in the ingot mold to prevent the washing action of the stream on the copper and the steel ingot skin is solidified promptly, no cutting or welding will occur. Failure of stools and the bottoms of plug or closed bottom iron molds is traced largely to this cause which is produced because of the much lower heat conductivity of cast iron.

The sudden contraction and expansion of the copper produces fine cracks on the surface which grow progressively larger as additional ingots are poured. It has been found possible to prolong the life of the copper stools by peening these cracks shut after every few heats and copper stools have lasted from several hundred to about 1000 heats in actual service on molds from 9 inches square to 22 inches square. When the copper is scrapped it can be remelted and cast into its original shape so that the reconversion cost is small.

Designed with Insert

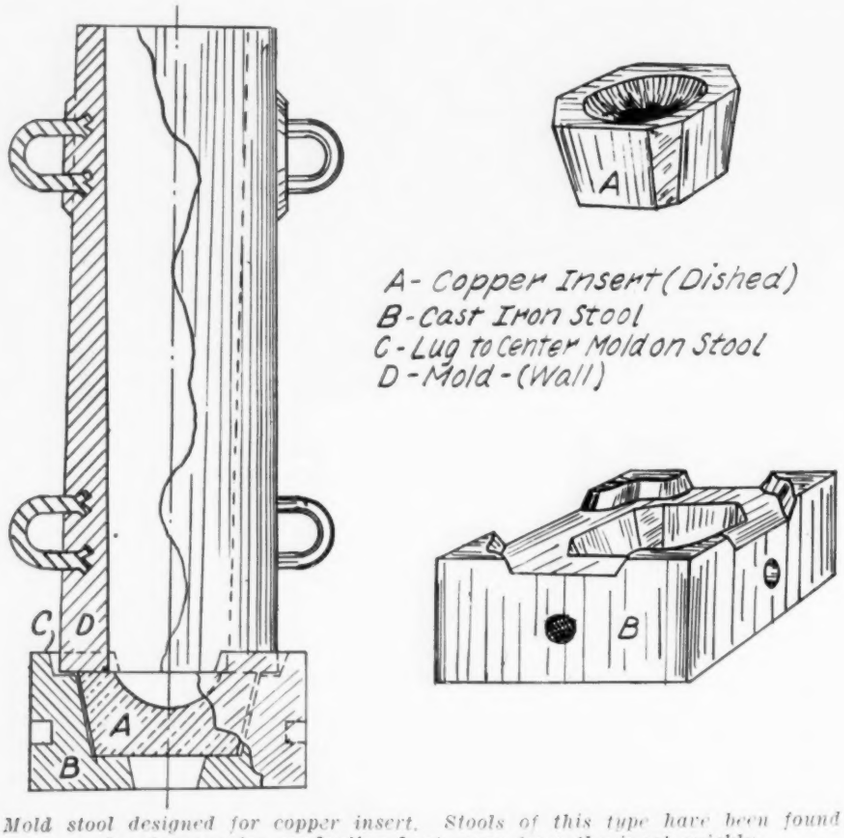
A copper insert manufactured by the Vulcan Mold & Iron Co., Latrobe, Pa., and upon which patents are pending is shown in the accompanying illustration. While the arrangement shown is for use on big-end-up molds, it can be used on big-end-down molds as well. The copper insert is designated "A". The cast-iron stool into which the copper insert fits, is designated "B". The stool is provided with lugs on the four corners to properly position the mold, D, over the insert.

The insert, A, is provided with a dish in the top surface which has been found to have the following advantages. Its shape throws the molten steel upwards away from the mold walls when the nozzle first is opened and thus prevents splashing to a large degree. It also prevents the cutting of the mold at the bottom. Then, too, the rounded end of the ingot reduces butt cracking of the ingot to a large extent. The tendency of the molten steel to weld to the copper is reduced considerably by the dish in the insert because a pool of metal is formed more quickly thus reducing the period of contact between the molten stream and the copper face.

By the use of the copper insert it has been found possible to reduce the total weight of copper which will be used in a flat stool from one-half to two-thirds. Thus, considerable less copper is carried in inventory with a plant using a large quantity of copper stools.

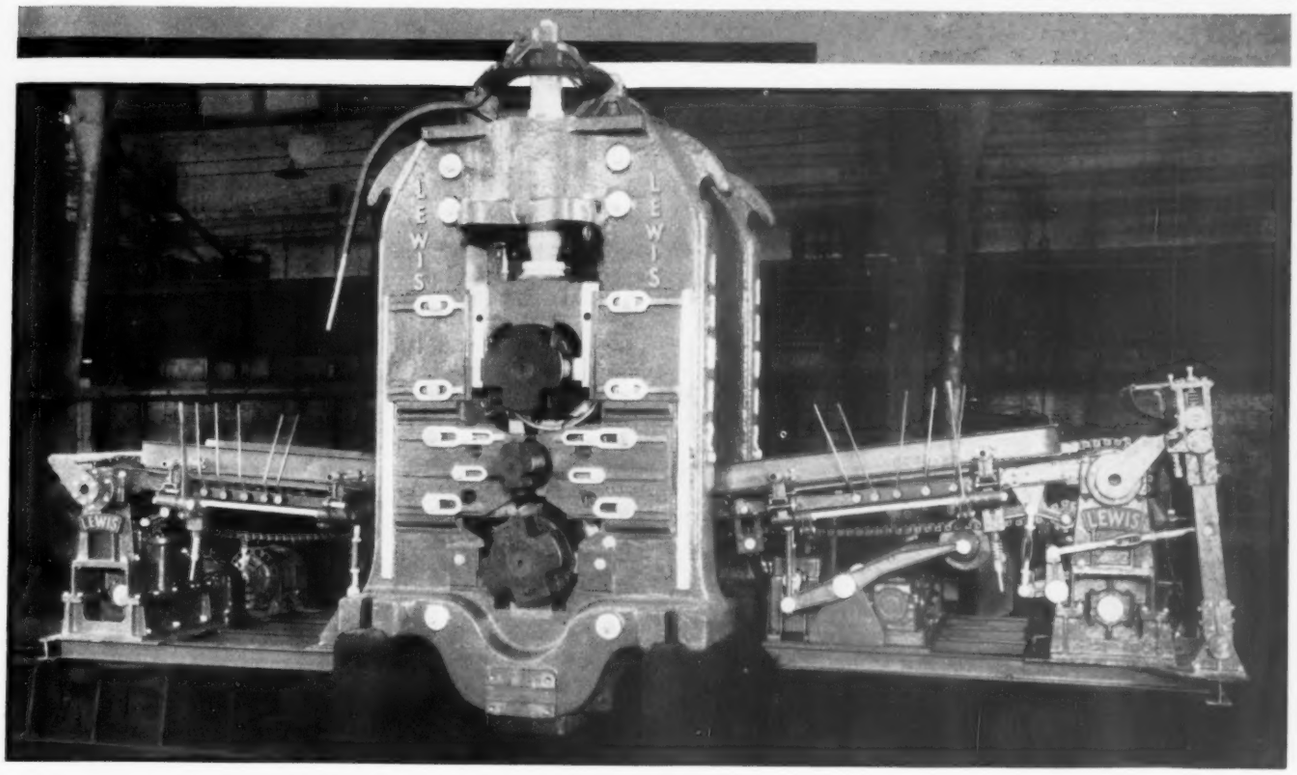
The mold rests directly on the copper insert and a clearance is provided between the top of the insert and the top of the stool. This makes an effective sealing joint and prevents the formation of fins on the ingot bottom.

No definite information yet is available as to the grade of copper which will produce the lowest ultimate cost. Pure electrolytic copper has the highest conductivity but it is more difficult to cast. Deoxidized copper having lower conductivity may weld and crack more readily but this has not yet been proven. Tests now in progress should determine the best grade.



Mold stool designed for copper insert. Stools of this type have been found advantageous for conducting heat away from the ingot quickly

The LATEST IN 3 HIGH SHEET MILL EQUIPMENT by LEWIS



The long experience of the Lewis engineering staff with rolling mill practice and problems, has made this new design extremely simple and accessible. Moving parts run in oil and are wholly enclosed. They are equipped throughout with anti-friction bearings and can be furnished on specification with automatic and semi-automatic screwdown and feeder and catcher tables.

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Insulation of Open Hearths Effects Saving in Fuel

MOLL checkers for many years have been in use in open-hearth furnaces with capacities up to 125 tons. A 4½-inch checker is able to exchange during a 20-minute cycle about 33 per cent whereas the Moll checker is able to exchange about 62 per cent during this period of its total theoretical heat content.

This data were presented at the opening of the 17th conference of the open-hearth committee, American Institute of Mining and Metallurgical Engineers held at Schenley hotel, Pittsburgh, June 28-29. Introductory remarks of L. F. Reinartz, chairman of the open-hearth committee, were presented in last week's issue, page 18.

The pattern of the Moll checker brick borders on the oval. The structural strength is equal to a 4-inch checker. Comparison of Moll and standard type checkers in 150-ton open hearth furnaces follows:

	Moll checker	Standard checker
Air Chamber		
Checker volume, cu. ft...	4,130	4,130
Heating surface, sq. ft...	24,500	12,060
Weight of checkers, lbs...	202,000	183,000
Heating surface per ton checker work, sq. ft.....	243	132
Free horizontal area, sq. ft.	164	170
Gas Chamber		
Checker volume, cu. ft...	2,753	2,753
Heating surface, sq. ft...	15,400	8,039
Weight of checkers, lbs...	127,000	120,000
Heating surface per ton checker work, sq. ft....	243	143
Free horizontal area, sq. ft.	108	114

Actual tests with this type checker disclose that the air enters the furnace with about 150 to 250 degrees Fahr. higher temperature and the waste gases leave the checkering with about 200 to 250 degrees Fahr. less temperature than on a furnace with solid checkers. The temperature drop of the flame was observed to be 10 to 25 per cent less. The melting rate increased 5 to 20 per cent based on a month's operation.

Reports Longer Life

In discussing the use of thermo-flake insulation, an open-hearth superintendent cited a furnace at his plant insulated with this material including the uptakes, the checkers and roof. A 3-inch insulation was used on the vertical walls, a 4-inch on the checker roof, and a 5-inch on the main roof of the furnace. This furnace, he stated, operated under difficulties because of intermittent schedules. However, he reported longer life and a material reduction in the saving of fuel. A campaign of 481 heats was obtained from the furnace with a running repair cost of 3 cents per ton of steel which was lower than any other furnace in his shop. A portion of this saving, he attributed to draft control and a portion to insulation.

From his experience with the use of insulation the life of the roof was increased as much as any other part of the furnace. However, he warned, the operator must regulate the flow of fuel or the roof may be burned off.

At another plant where one furnace is insulated completely, the checkers being set in a steel pan and insulated to the floor level, a reduction of fuel was obtained amounting to 5 cents per ton of steel.

Roof Repairs Unnecessary

A fully insulated furnace at another plant has made 384 heats without any roof repairs. The fuel saving amounts to 8¼ per cent over the shop average. While the output was 0.4 tons per hour lower than shop practice, yet the ingot yield was 0.2 tons per hour higher. In the construction of an open-hearth roof the operator of this shop prefers as insulating material 1½ inches of granulars and 2½ inches of thermo brick with cracks dusted over.

Insulation is responsible for a 10 to 15 per cent saving in fuel and an increase in production, according to another open-hearth operator whose furnace is insulated right up to the slag pockets. About 676 heats were made before it was necessary to take the furnace off on account of clogged checkers. At the time of shutdown the furnace still had 6 inches of brick in the roof. Rebuilding costs and repairs on this particular furnace amount to less than 30 cents a ton of steel produced.

On an 80-ton open hearth in the Pittsburgh district all exposed brickwork other than that of the roof has a 1½-inch coating of thermo-flake which shrinks to a thickness of 1-inch. Below the charging floor the insulation is composed of blast furnace slag. Casing sheets are spaced between the I-beam channels and packed with blast furnace slag 9 inches thick. The entire cost of insulating this furnace, including labor, amounted to $1250.

After 60 heats it was necessary to put in a new front wall. After 109 heats a new front and back wall were installed, these being replaced at the end of the 145th heat. After 154 heats the furnace was shut down for general repairs. During the second run of this furnace no delays were experienced until 135 heats had been tapped when the front and rear back walls were repaired. The checkers however, were not disturbed. After the 177th heat partial repairs were made. Back and front walls were replaced at the end of the 224th heat. General repairs were made after the 324th heat.

Repair Costs Unchanged

No savings in repair cost were reported. The speaker, however, mentioned that a saving in fuel oil amounting to 1.7 gallons per net ton of good ingots was realized. Before the furnace was insulated the amount of fuel oil used per net ton of ingots was 37.6 gallons. After the furnace was insulated, however, the oil consumption ranged from 33.2 to 35.9 gallons. All cold iron charges were used and no saving in the time of heats was noticed.

On an 80-ton insulated furnace located in the East, 394 heats have been tapped and a fuel saving of 10 per cent has been realized. On a 30-ton basic furnace at an Ohio shop, 7 inches of insulation is used on the checker roof, 4½ inches on the wall, 5 inches on the main roof and 4½ inches on the back and end walls. Fuel savings as a result of this construction amount to 33 1/3 per cent. Former practice of 40 gallons of oil per ton of steel was reduced to 31 gallons per ton. Actual heats are being melted on 21 gallons of oil per ton of steel in the ladle, according to the superintendent of this shop.

An operator in discussing the use of Kromag brick in front or end walls, blocks, or roof, mentioned when this particular type brick is joined with silica brick some fluxing out is noticed. Generally, he reported it gives from 2½ to 3 times more life than silica brick.

This type refractory lasts 10 per cent longer than silica brick, according to an Ohio steelmaker, who based his assertion on from 650 to 700 heats. In the jambs, he stated, Kromag lasted no better than ordinary chrome brick but between the front and back corner blocks it gave 25 per cent more life. In hot metal mixers this type brick did not hold up well at the metal line.

Kromag used at the endwall lasted 165 heats compared with 450 heats with metal kase brick, according to another open-hearth operator.

Wm. C. Buell, Jr., engineer, Cleveland, in discussing "Notes on the Re-engineering of an Existing Open-Hearth Plant" voiced the opinion that flame condition has a decided bearing on the yield. Some operators, he asserted, will concur on this opinion, usually with reservation; many or most will not. In general it is believed that a considerable oxidation of the metal and metalloids

of the charge will take place in the presence of the strongly oxidizing flame often preferred and observed during the melt-down and immediately after the charging of iron. The oxidizing flame ordinarily is stated to be preferred on the grounds that it works faster and is hotter. Mr. Buell disagreed with this belief and offered that a correctly developed and controlled nonoxidizing flame will develop as much if not greater working temperature and will act as rapidly as the oxidizing flame.

Relative fuel cost is controllable by combustion equipment as such only to a small degree. The design and operation of every component of the furnace and system from the intake of the fuel and air to the stack has a vital reaction on fuel practice, Mr. Buell asserted. In addition, both the human factor of operation and the metallurgy of any particular type of heat may greatly modify fuel results. With coal converted into producer gas at $4.00 a ton to include the cost of gasification, the furnace fuel will cost about 16 cents per million B.t.u. Obviously a savings to the process of a million B.t.u. (85 pounds of coal per ton) is worthwhile. A saving of fuel the speaker contended, is more correctly and easily made through porper interior design than by any other method. On a furnace recently designed by the speaker the fuel savings over the average shop practice is considerably above 100 pounds of coal, with an apparent savings of at least 20 cents per ton of ingots.

Opinion Is Divided

In discussing multiple pass checkers a steelmaker who has three furnaces equipped with 2-pass checkers mentioned that he has experienced an increase in production of 10 per cent with a corresponding decrease in fuel consumption. The furnaces in question use forced air and operate at 1400 degrees Fahr. in the second pass. On the other hand an open-hearth operator mentioned that he had tried multiple pass checkers but without success.

The question "How Successful Has the Use of Rigid Tie Rods Been?" brought out many answers. One operator mentioned that he lays tar paper between the brick. When the furnace is warmed up the roof will rise from 2 to 3 inches and by this method, he asserted, the use of 200-pound wrenches have been avoided. Rigid tie rods are absolutely necessary in sloping back wall construction, according to an engineer.

In discussing the relationship between ingot mold iron analysis and mold life, a manufacturer of molds mentioned that the life is obtained only when the mold fails by fire cracking. Analysis of iron can have a wide range, the speaker stated, but the importance of the relationship between total and combined carbon should not be overlooked. Fire cracking, he contended, is a function of the growth of grains in the iron. He emphasized that mold failure largely is due to fire cracks. Total carbon should be low and the combined carbon between 0.60 to 0.70 per cent and if this is followed, he explained, mold failure can be kept low. Further comment disclosed that the presence of chromium will check the growth of cast iron.

Experiments are being conducted at two plants in this country with ingot molds containing molybdenum. Little cutting out of the mold is apparent when approximately 0.20 per cent molybdenum is employed. The experiments disclose that when 0.50 per cent molybdenum is used, early failure of the mold occurs due to cracking.

Eliminates Bottom Cutting

In discussing mold coating, rate of pouring and other open-hearth practice effects on soft steel ingot surface with respect to surface defects in the finished product, one steel producer mentioned that since using direct metal molds no difficulty in cutting out in the bottom of the mold has since been experienced. Another operator cited the use of various materials for mold coating. When tar is used, he stated, blisters result. Bone ash gives a fair surface. Talc, alum and water glass, glycerine and rosin smoke do not afford attractive ingot surfaces, he declared.

About 40 heats of steel have been poured in 20-inch copper molds in a commercial plant according to a progress report. Visual inspection discloses that the ingots are cleaner on the surface. The molds withstood handling in the regular manner. They did not cut but instead developed heat checks and because of these cracks, they were taken out of service. Experimental work shows that the design of copper molds will have to be different than standard molds in order to avoid strains.

Experimental work conducted on copper mold stools has been favorable and discouraging. Some of the copper stools in service at a large independent steel plant have been cut away probably due to the fact that copper has a low melting point and the mass of copper in the stool was not sufficient to absorb the heat at the outset. If copper is kept at certain minimum temperatures it is felt that the material will withstand the cutting action of the stream. All types of steel—soft, high-carbon and alloy grades—exerted a cutting effect. However, some high-carbon and alloy steels are worse than low-carbon steels in this respect. Frequently copper stools will crack straight across for no apparent reason. More trouble is experienced in this connection with rectangular ingots than with the square or round type. Much has to be learned about the kind of copper suitable for molds and stools stated the report. Those conducting the experiments are of the opinion that if a sufficient weight of copper is in the stool, many difficulties can be avoided. At the moment, however, the proper weight to use has not been determined. The area of the ingot bottom to the depth of stool is the important factor.

In one test of a copper stool, alligator cracks developed after about 70 heats. As the use continued the alligator spots became more pronounced and after about 800 heats little walls stuck up. The stool then was turned over and used on the other side; since then 400 more heats have been taken off. It is expected that the stool will show a life of 1500 heats.

Approximately 600 heats is about the life to be expected from copper stools based on the costs. During the experimental work, 5000 ingots have been cast on copper stools with no difficulty due to stickers. Throughout all these heats no adverse effect on the quality of the steel has been noted. Stools may be dished in order to obtain a higher recovery of steel. In conclusion the report disclosed that the conductivity and weight of copper is highly important. When made of low conductivity copper, the stools disclose slight cutting. No coating whatsoever was used on the surface of the copper.

Recommends Dished Stools

A manufacturer of molds who recently developed a stool with a copper insert mentioned the advisability of dishing the stool in order to avoid splashing of the mold wall. The weight of the copper insert, he stated, is not yet determined although he mentioned that stools had been manufactured weighing from 750 to 4000 pounds. On high-carbon steel he reported no cutting of the copper although he mentioned that sometimes there has been a tendency toward welding. No welding was experienced on rimming heats but on 0.70 to 0.80 carbon steel welding was encountered about 50 per cent of the time. Alloy steels cast on copper inserts, the speaker explained, have no adverse effect on the ingot. A reduction of butt cracks at the end of the ingot and a material reduction in the splashing may be expected when copper dished stools are employed. The advantage of copper mold stools, he pointed out, is that they take the heat away from the ingot faster than the ingot imparts to them. A more detailed description of mold stools with copper insert is presented on page 36.

In discussing the advantages of double stopper ladles, an open-hearth superintendent mentioned that at his plant elliptical ladles were employed and found to be much faster. Ladles of this type can be

(*Please turn to Page 45*)

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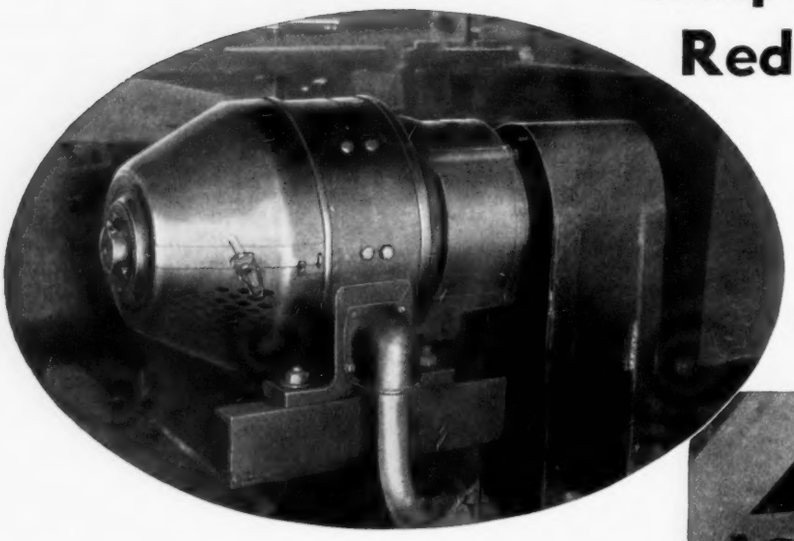
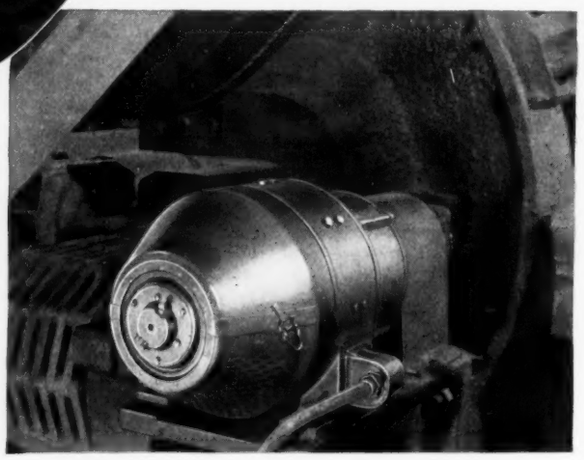


DRIVING PLATE-HANDLING EQUIPMENT (*left*) — a G-E 5-hp. gear-motor fits conveniently into an out-of-the-way corner of the machine



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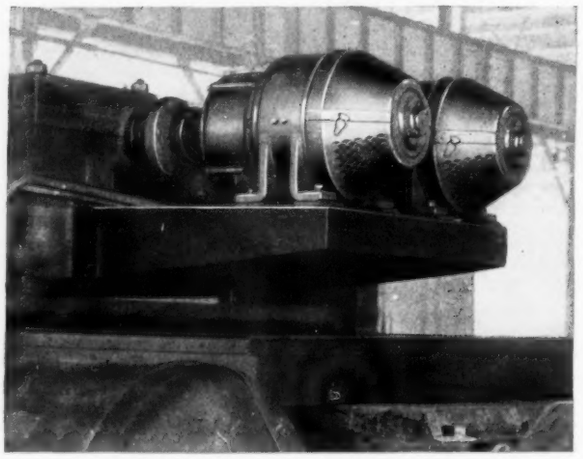

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020-49

GENERAL ELECTRIC

PRODUCING HIGH-SPEED STEEL IN THE CORELESS INDUCTION FURNACE

BY PETER BARDENHEUER AND WERNER BOTTENBERG

Part III

Conclusions

The results of these experiments definitely show distinct advantages of the coreless induction furnace for melting high-grade alloy steels. The even temperature distribution in the induction furnace is advantageous, as well as the possibility of preventing any overheating of the bath and any local overheating. The detrimental influence of overheating on the cutting qualities of high-speed steels was shown by some preliminary experiments. Table VI contains the composition, melting temperature and cutting capacities of steels having about the same analysis but heated to different temperatures.

The heats were all made similar to Heat 2 (subsequently alloying melted carbon steel). The cutting tests were identical, using a cutting speed of 748 inches per minute, 0.161-inch feed and 0.157-inch depth of cut (the machined shaft had a tensile strength of 125,164 to 127,008 pounds per square inch and consequently the values ascertained are not directly comparable to those given in Fig. 13.

Temperature Increases Solubility

From the relation between bath temperature and the quality of steel it is known that the solubility of gases and oxides increases markedly with the temperature, and deoxidation is reduced. However, it is not certain that these are the only disadvantages of a high melting temperature.

For alloying, a uniform distribution of the alloying elements is of prime importance, and especially for those steels containing double carbides. It is known that the latter disperse only with great difficulty in the bath and are found in the structure as large units or in the form of streaks. This defect, which has been referred to in the work of others, one usually tries to overcome by heavy forging.

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Dusseldorf, Germany
Vol. XIV, No. 7

BY WILLIAM ADAM JR.
Ajax Electric Co. Inc.,
Philadelphia

(*Continued from June 25 issue*)

Segregation Is Prevented

The strong electrodynamic circulation of the bath in the high-frequency furnace is extremely favorable in distributing the alloying elements and preventing the segregation of the carbides in the steel. This dispersion action is noticeable in the steel quality through the even distribution and finely divided carbide particles.

Another important advantage having great significance of the quality of steel, is the ease of slag changing. Any extensive liberation of oxygen from a steel bath can be accomplished only under a slag that is low in metallic oxides. When the slag has accumulated metallic oxides, it is best to replace it with a fresh one. Likewise, desulphurization also requires a slag poor in metallic oxides. An almost complete removal of such impurities by repeated slag changes implies however, in all cases, an improvement of the mechanical properties of the material, because these are impurities which are located for the largest part on the grain boundaries and seriously affect the intercrystalline cohesion of the material.

The slagging effect in an acid-lined furnace using a glass slag of high viscosity is better than in a basic furnace because an acid slag converts manganese and iron oxides to silicates and protects the bath from their influence. The resulting low oxygen content of the bath, which permits a free silicon content, has an important bearing on the amount of deoxidation products remaining in the steel as well as the chemical and physical properties. This free silicon content is distributed evenly in the bath and is always so low that no high melting silica is formed but only the low melting manganese and iron silicates. These readily ball together as large drops and rise to the top, whereas finely divided precipitates, especially in crystalline form, do not readily congregate and separate into the slag. They remain suspended in the fluid steel a longer time the smaller their size. The fact that the steels melted in an acid lining have better cutting properties than those melted in a basic furnace can be attributed primarily to the absence of nonmetallic inclusions.

Reactions Not Disturbed

The advantage of melting steel in an acid lining is especially noticeable in the crucible process, which includes melting in the high-frequency furnace, because the characteristic reactions are not disturbed by detrimental influences. This particularly is true for the so-called crucible reaction, i.e. the reduction of silica out of the crucible wall and from the acid slag by the carbon in the bath. It is generally known that the high quality of crucible steel is attributed primarily to the action of silicon in the nascent state. W. Hes-

Table VI

Effect of Various Melting Temperatures

Designation	C %	Si %	Mn %	P %	S %	Cr %	W %	V %	Mo %	Melting Temp. ° Cent.	Cutting capacity, min.
A-1	0.70	0.28	0.28	0.011	Trace	4.40	17.60	1.65	0.94	1590	10
A-2	0.69	0.14	0.24	0.006	0.014	4.00	17.59	0.69	0.82	1480	28
B-1	0.81	0.31	0.35	0.008	0.010	4.06	19.48	1.28	0.67	1560	15
B-2	0.78	0.19	0.28	0.007	0.006	4.34	18.44	1.28	0.70	1480	27

senbruch[5] has shown that this reaction has its fullest effect in steels of about 0.5 per cent carbon in the acid lined high-frequency furnace and that there is an equivalent amount of silicon, taken up by the bath, for the amount of carbon burned.

By observing the foregoing generally held metallurgical viewpoint, steels of particularly good cutting capacities were obtained in those cases in which the entire charge including the alloying additions, and using no alloy scrap, was loaded and melted down (Heats 3 and 4). This method has the advantage that gas-containing parts of the charge lose a large part of their gas through the slow preheating. On the other hand, if these materials are introduced directly into the fluid steel, the gases largely or wholly enter the bath, because the solubility of gases and oxides in the iron is great (Heats 2 and 7). For this reason, great care is taken in using ferroalloys in steel plants. Somewhat poorer cutting capacities were observed in those cases in which only high-speed steel scrap was melted. Although certain advantages for melting high-speed scrap are offered by the arc furnace, in which the solution and distribution of the alloying materials rich in carbides is difficult, it can be assumed that this remelted scrap will not be freed of defects caused by the previous melting process, and that any disadvantageous effect, such as gas accumulation through an excessively high melting temperature, will not be entirely eliminated.

It is self-evident that high-speed scrap that was melted without metallurgical defects is good material for a charge and can be used without hesitation.

Influences Quality of Steel

From the results of cutting tests made with the steel of Heats 3 and 4, the slow degasification of the charge evidently has a favorable influence on the quality of the steel. For this reason, and also because of the danger to the operator from the sudden metal splashes when charging cold ferroalloys as in Heats 2 and 7, the alloying materials were preheated to a red heat in all the subsequent melts, which liberated most of the gases. This practice also produced excellent cutting capacities in Heats 5 and 6, in which fluid carbon steel from the basic arc furnace was charged and then alloyed. Whether or not the influence of the acid lining and slag on the original basic character of the steel offers any additional special metallurgical advantage which is reflected in the quality, cannot be decided. Nevertheless, the cutting tests for Heat 8a show that the simple after-treatment

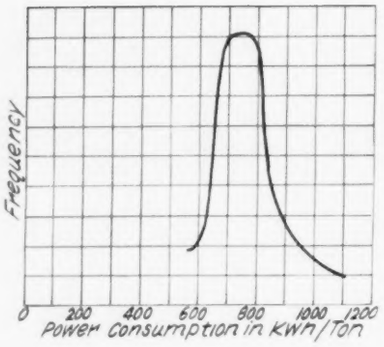


Fig. 16—Power required to melt charge

of finished steel from the basic arc furnace noticeably improves the cutting properties of the steel. The purity of the charge materials used at any rate is far less significant than the metallurgical working method. Moreover, if the raw materials are in such form that they require several chargings, it makes the melting process much more difficult. With this practice the cutting capacity attained is only moderate.

Power Consumption

Although the cutting capacity is of paramount importance when valuing a high-speed steel and the melting cost has such little effect on the price structure, nevertheless, the power consumption in the high-frequency furnace is of some interest especially for a comparison with other melting methods.

As may be seen from Table I, the power consumption for all the experimental heats was rather high. This is due to the fact that the weight of the charges, over 661 pounds, was too great for the 100 kilowatt generator, which increased the melting time beyond that normally required. Moreover, the experimental conditions caused delays that would not occur in practical operating condition. The size of the charge necessitated several chargings, or if

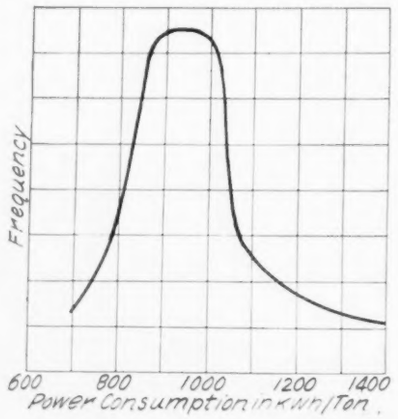


Fig. 17—Total power consumption

charged at one time caused a part of it to extend out of the crucible, resulting in the loss of heat. Furthermore, on taking the first sample the furnace was placed on a reduced power input while the analysis was made. This required about one hour, after which the furnace had to be brought up to required temperature. Therefore, the power consumption in these tests has no real significance. The time and power required to bring the charge to a fluid state is more important. The average power consumption in 200 heats, in melting down high-speed steel from a cold crucible, was 735 kilowatt hours per ton (See Fig. 16). In continuous operation this should be reduced by 75 kilowatt hours per ton. The figures for the total power consumption of 200 heats, Fig. 17, showed large variations because the conducting of individual heats is dependent largely on the plant conditions. However, the power consumption of a 661-pound high-frequency furnace installation is probably such that it can be equalled only by an arc furnace of much greater capacity.

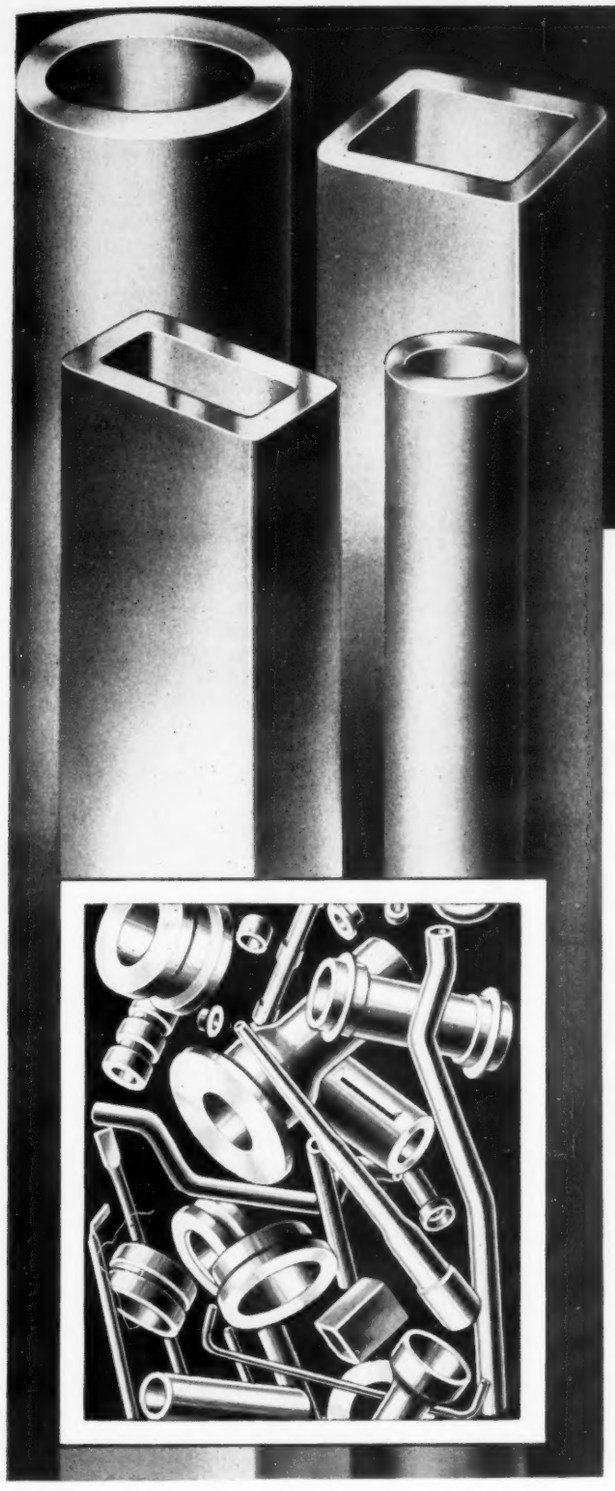
Considering the high quality of the high-speed steels produced in the coreless induction furnace, the power consumption is of minor importance. At least, one should not attempt to reduce the power consumption at the expense of quality. From the results of these experiments, it is not advisable to leave a "heel" of metal in the furnace in order to speed the melting (See Heat No. 2).

Summary

The adaptability of the coreless induction furnace for melting high-speed steels was investigated by test heats in both acid and basic linings. The influence of various metallurgical operating methods were examined. The conditions under which the cutting tests were made were kept constant in order to judge the steels.

It was shown that high-speed steels could be made in the coreless induction furnace which possessed extraordinary cutting qualities, by observing the metallurgical advantages offered by this furnace. The high quality of the steels can be attributed primarily to the following:

1. Prevention of any unnecessary over-heating of the bath.
2. Complete solution and distribution of the alloying materials, especially the carbides, due to the electrodynamic bath circulation.
3. Far reaching purification of the bath especially with the acid lining, by several slag changes.
4. Elimination of slag particles by a quiescent period before pouring.
5. Preventing the introduction of impurities in the form of gas



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through the alloying materials.

From the various operating methods used, those in Heats 3 and 4 as well as 5 and 6 led to useful results, and are of special significance in the manufacture of high-speed steel. The peculiarity of the first of these methods in general consists of borrowing the well-known crucible melting practice—melting down unalloyed steel together with the alloying materials in an acid lining. In the second case, fluid carbon steel, which may be melted in another (basic) furnace, is alloyed in the acid high-frequency furnace with alloying materials preheated to a red heat in order to liberate most of the gases. Obviously, the general directions given to assure perfect metallurgical work must be strictly adhered to in both cases.

The simple after treatment in the acid high-frequency furnace of high-speed steel melted in the basic arc furnace resulted in a noteworthy improvement of the cutting capacity. The purity of the charge materials was of less influence than the melting treatment.

Appendix

The knowledge accumulated in the foregoing work was confirmed in another coreless induction furnace. Consequently, the following experimental heats were made in a 661-pound furnace at the plant of Ed. Dorrenberg Sohne, Runderoth. This installation previously was described in detail[10]. The furnace was acid lined and powdered glass served as slag.

In the first heat (11187) 423 pounds of material (high-speed scrap, puddle steel, muck bar, pig iron, ferrochrome, tungsten (sintered) and about one-third the desired vanadium content in the form of ferrovanadium) was charged cold in the crucible (282 pounds was added subsequently). This charge was melted within one hour and the first slag removed.

Composition of Melt

The melt had the following composition: 0.73 per cent carbon, 0.24 silicon, 0.2 manganese, 3.87 chromium, 17.98 tungsten, 0.6 vanadium, 0.12 molybdenum, 0.009 oxygen, 19.8 cubic centimeters per 100 grams total gas.

During the following one hour refining period at 1480 to 1510 degrees Cent. the slag was changed several times. The composition of the various slags is shown in Table VII.

Twenty minutes before disconnecting the current (prior to the fourth slag change) the remainder of ferrovanadium was added, whereupon the oxygen content dropped to 0.006 per cent while the total gas remained unchanged. The melt remained in the furnace for four minutes with the current switched off and then was poured at 1470 to 1480 degrees Cent. through an intermediate funnel into the mold. Table VIII gives the analysis of the finished steel.

The following heat (11188) deviated from the foregoing in that only preheated materials were added and the average melting temperature was lower. Only 441 pounds of the charge could be placed in the crucible at one time; 265 pounds was preheated to about 600 degrees Cent. and added afterwards. The charge was fluid within one hour, and had the following composition: 0.8 per cent carbon, 0.24 silicon, 0.21 manganese, 3.84 chromium, 17.66 tungsten, 0.82 vanadium, 0.21 molybdenum, 0.014 oxygen, 36.1 cubic centimeters per 100 grams total gas.

The spent slag was removed and renewed several times during the refining process. The change in slag composition is shown in Table IX.

After the fifth slag change the balance of preheated ferrovanadium was added. The oxygen content then was 0.005 per cent and the total gas 20.6 cubic centimeters per 100 grams. The total refining period covered over 1½ hours and the temperature averaged 40 degrees less than the previous heat. After switching the current off, the heat remained in the furnace for five minutes and then was poured at 1440 to 1450 degrees Cent.

Both heats were forged and made into lathe tools from annealed rods, 0.98 x 1.57 inches. The shape of tools was the same as in the earlier tests. Hardening and tempering was done the same way. A third heat (11,186) made in a commercial way was included in order to compare with the test steels. Therefore, three heats were available for comparison which were poured to the same dimensions, forged, annealed, hardened and tempered in the same manner. The difference between the individual heats was in the melting process, i.e., the method of making additions, slag changing, refining period, the melting and pouring temperature.

Cutting Life Investigated

Carbide distribution was the finest and most uniform in Heat 11,188. After tempering, the steels were investigated for cutting life. The testing conditions were as follows: depth of cut 0.118-inch, feed 0.051-inch cutting speed 72 feet per minute. The manganese-silicon steel shaft

Table VII

Composition of Slags

Slag no.	SiO_2 %	CaO %	MgO %	Al_2O_3 %	MnO %	FeO %
1	54.6	8.60	0.47	1.81	10.40	7.91
2	61.8	8.30	0.94	2.42	8.02	4.31
3	69.8	8.06	0.72	5.90	3.21	4.40
4	70.0	8.00	1.18	5.01	2.87	3.79
5	70.2	11.90	1.23	1.49	1.27	2.68
6	71.8	5.20	0.90	2.16	1.22	1.07

Table VIII

Analysis of Melted Steels

Heat no.	C %	Si %	Mn %	Cr %	W %	V %	Mo %
11186	0.74	0.59	0.28	3.90	17.96	1.06	0.50
11187	0.72	0.22	0.18	3.84	18.04	0.95	0.16
11188	0.78	0.24	0.19	3.83	17.38	1.03	0.16

Table IX

Change in Slag Composition

Slag no.	SiO_2 %	CaO %	MgO %	Al_2O_3 %	MnO %	FeO %	O_2 in bath %
1	62.1	11.7	1.40	3.12	6.54	4.75	0.014
2	69.3	12.3	0.87	2.63	3.25	2.28	....
3	69.0	12.2	1.30	2.94	2.36	2.72	....
4	68.9	12.3	1.05	2.74	3.15	4.31	....
5	70.1	12.4	0.98	2.66	2.40	3.98	0.006
6	72.6	12.8	1.37	2.06	1.77	3.43	....
7	70.9	12.6	1.00	2.43	1.01	2.72	0.005

[10] O. Dorrenberg and N. Broglio Die Erzeugung von Edelstahlen im kernlosen Induktionsofen. Stahl und Eisen Vol. 50 (1930) p. 617 and N. Broglio: "Fortschritte im Baer und Betrieb des kernlosen Induktionsofen Zur Stahlerzengung." Stahl und Eisen Vol. 51 (1931) p. 605 and 635.

turned had a tensile strength of 128,000 per square inch.

The cutting values obtained for the three heats are shown in Fig. 18. As previously described, the peak values were obtained from a fourth test. The results in general agree with the foregoing work even though they cannot be directly compared because of the altered testing conditions. For a comparison a number of commercial steels of the same composition were tested and the average peak value was only 6 to 8 minutes.

These operating tests have shown that by observing the general rules established in the investigation for proper metallurgical procedure in the coreless induction furnace, a decided improvement still can be made in the quality of high-speed steels. These test heats, therefore, confirmed the results obtained in the foregoing investigation.

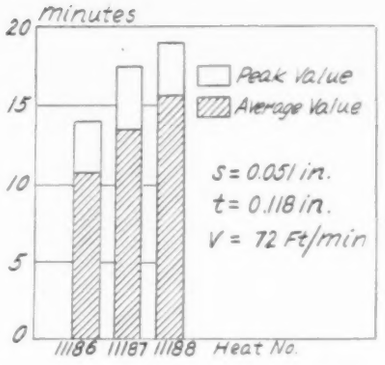


Fig. 18—Cutting capacity of high-speed steels melted

Insulation Effects Saving in Fuel

(*Concluded from Page* 39)

made shallower thus reducing the static head pressure and affording a quick pour of metal. Since elliptical ladles were installed in his shop a material improvement in pouring practice over standard practice has been experienced. Ladles in use at another plant with twin stoppers on 51-inch centers have afforded a savings of 12 minutes in the pouring time.

In discussing the life of ladle linings on double pour ladles, one operator mentioned that on 3½-inch brick from 10 to 12 sheet bar heats are handled compared with 20 to 24 heats when high-carbon steel is going through the shop. The contention of another operators was that the life of ladle brick depends upon the volume and type of slag at the top of the heats.

Sensitive conditions in open-hearth practice as observed by a carbon and silica carbide thermocouple were described by a metallurgist. A couple was inserted in the wicket hole of the checkers, another in the downtake and another just before the first pass of the checkers. In the last position the thermocouple extended 15 inches in the gas stream and in this position the sensitive conditions were observed. When No. 1 charging door was opened the pyrometer showed a drop of from 20 to 30 degrees Fahr. When No. 2 door was opened the temperature drop amounted to 80 degrees; opening No. 3 door caused the temperature to recede 145 degrees.

A method of making up a soft tap hole, as submitted by a steelmaker, follows:

"The opening provided in the brickwork for the tapping hole is 10 inches wide by 13 inches high at the spring of the arch covering this opening. The bottom of the opening is on a line with the magnesite brick of the furnace bottom. The latter is made up of one course of clay brick set on edge on the pan, one flat course of chrome brick and a roll lock course of magnesite brick.

"In constructing the bottom with magnesite the backwall is built with "V"-shaped openings at the tap hole until there is about 15 inches of the back bank built in with magnesite. Then a 6-inch pipe packed with dolomite is placed in the tap hole opening and blocked in place. Around the pipe on the inside of the furnace is packed magnesite and tar, and magnesite and slag back of this. The space is filled in from the tapping platform with a mixture containing 3 parts of ganister or chrome, 1 part clay and sufficient water to make the mixture of the right consistency for packing. This mix is rammed in as hard as practicable and the space entirely filled. Every three hours the dolomite is removed from the pipe, the seal on the inside end broken, then the pipe is refilled with dolomite and the face of the tapping hole covered with magnesite. Each layer of magnesite is set, this practice being followed until the back bank and tapping hole are built up to the proper dimension.

How Top Hole Is Closed

"After each heat is tapped and the bottom well drained, the area in the front of the tap hole is dried up with slag. The tap hole is closed by holding a rabble against the end of the furnace. Bottom material is thrown into the tap hole from the tapping platform side and packed in well against the rabble held against the inside end. Two shovelfuls of raw dolomite is used to face off the inside surface of the tap hole and a sand plug is rammed in the outside end.

"Tapholes made up and maintained in this manner last the life of the furnace. There are times when the hole becomes too large and at these times repairs are made by using the pipe as before explained."

Residual copper from 0.05 to 0.12 per cent has no effect on the rolling properties of soft steel, according to one open-hearth operator. A metallurgist pointed out that with higher amounts of copper in steel there is a characteristic roughness in the surface. This roughness, he explained, can be avoided by having one-third as much nickel in the steel as copper. A speaker mentioned that he had analyzed sheets made at various plants for copper and had found the content of this element to range from 0.05 to 0.20 per cent. In no case, he stated, has copper exerted any effect on the drawing qualities of the steel.

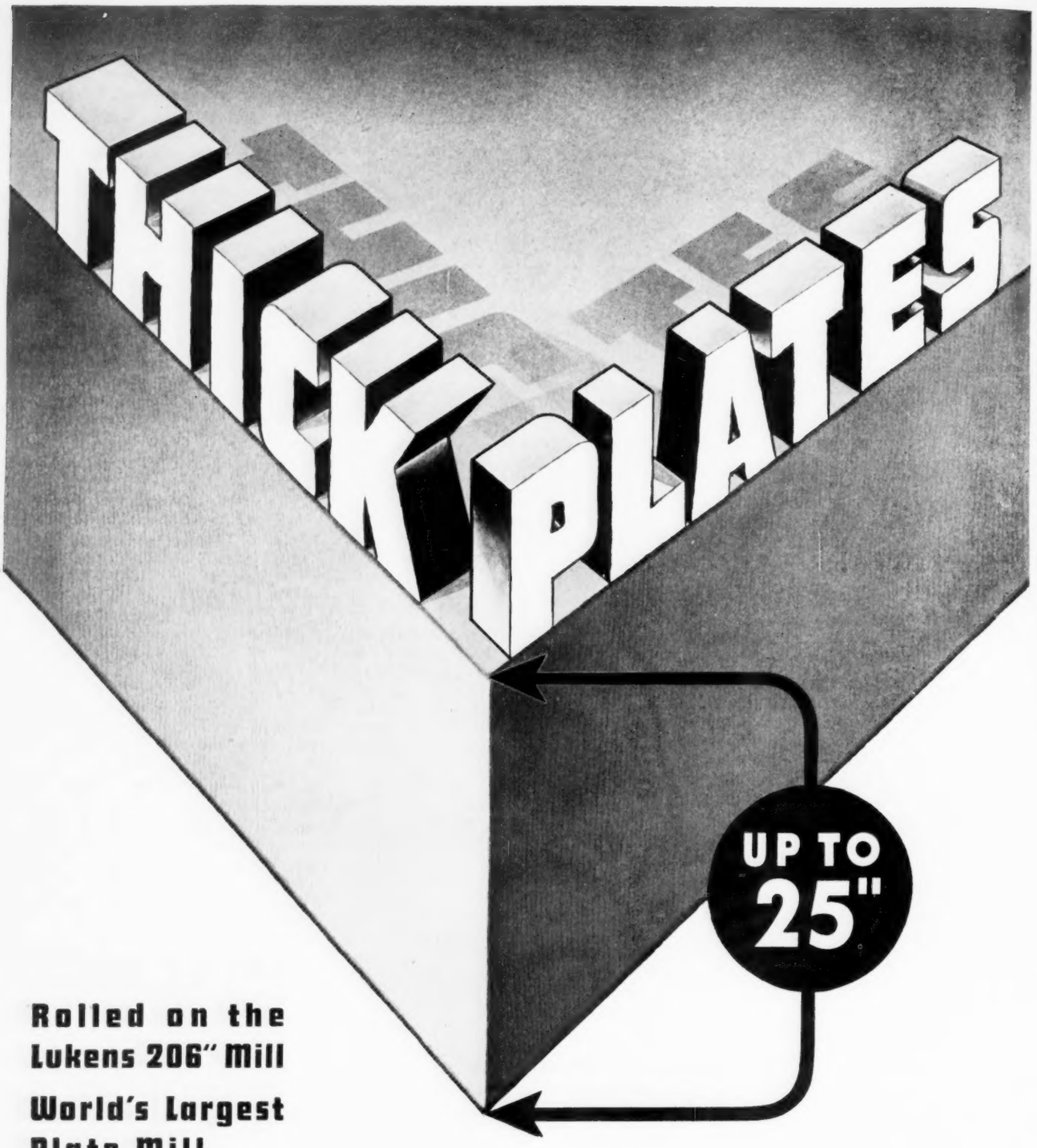
Does Scrap Affect Iron?

Effect of "cheapeners" in blast furnace burdens on the quality of steel produced was discussed by one steelmaker. Assuming that most of the scrap charged in the blast furnace consists of borings and turnings, he said, which generally is a mixture of all kinds of alloys and carbon steels together with bearings, metals and machine shop turnings, some of which may contain considerable quantities of copper and tin, it may be said that this contamination is carried to the open hearth.

We have found, he stated, that tin has some effect on the rolling qualities of steel. It is doubtful, he continued, if a selected scrap used in the blast furnace (providing the furnace does not get too cold) has any harmful effects on steel quality except from the alloy contents introduced into the metal.

Open-hearth slag, he asserted, has some beneficial use in that it raises the manganese content of the iron which in turn gives a better quality of steel. However, there are some disadvantages, as it raises the phosphorus in the iron, and this has to be taken care of in the open hearth. If when making high-carbon steels and using silicomanganese in the bath, the iron oxide in the slag is too low, there may be a kick back of phosphorus in the steel. In the speaker's opinion the use of open-hearth slag in the blast furnace has more good recommendations than bad.

It is my understanding, he stated, that copper has some hardening effects up to a certain point which would effect the ductility of the steel. If the limit of the copper content in hot metal were kept at 0.030 per cent and under, other contaminations associated with the copper and which usually are charged in some scrap, such a chromium and nickel, likewise would be kept low to such limits that they would be practically harmless to the quality of the steel.



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NEW EQUIPMENT

PRODUCTION FABRICATION
TREATMENT FINISHING

Foot-Candle Meter—Weston Electrical Instrument Corp., 619 Frelinghuysen avenue, Newark, N. J., has brought out a device known as a foot-candle meter for measuring light instantly and accurately in fac-

Weston foot-candle meter provides means to measure light

tories, offices and laboratories and wherever else people work, study or play under light. It measures light values whether daylight or artificial. It not only measures the light, but shows instantly, in colored areas on the scale, whether the light is right or wrong for any task or location.

Operation of the instrument, shown herewith, is simple. To measure the light in any particular area, all that is necessary to do is to place the meter on a table or desk or chair or machine or hold it in the hand and the pointer instantly indicates the light intensity prevailing there. The heart of the instrument is the Weston Photronic cell that is connected to a sensitive milliammeter, the scale of which is calibrated in foot-candles. The foot-candle meter can be carried conveniently in one's pocket. It is entirely self-contained, requiring no batteries, etc.

The new instrument makes it possible to put a practical appraisal on the value of proper lighting. This development now supplies an instrument that indicates not only what light is being obtaned but also what the proper lighting in the location under observation should be. With this simple meter, the lighting can be quickly standardized and maintained at the most efficient and economical levels.

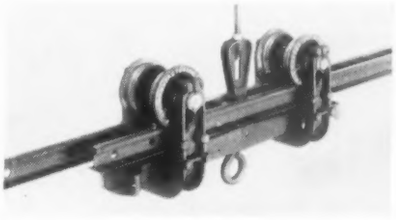
♦ ♦ ♦

Polishing Wheels—West Co. Inc., Philadelphia, recently has developed a new type of polishing wheel for use on polishing stands, surface, internal, roll, bench, floor, and portable grinding machines for all classes of polishing operations from roughing to the finest lapping. The wheel is composed of different types of rubber thoroughly impregnated with abrasive grain of any desired size. The types of rubber vary from a soft and flexible to a stiff hard product which is designed to provide the effect and feel produced in set-up polishing wheels having bases of felt, wood, leather or canvas. As may be surmised, the new polishing wheels are similar in construction to a regular grinding wheel, and according to the makers, may be used until worn down almost to the arbor hole.

Consequently, recoating the wheel as practiced with the usual type polishing wheel is eliminated. The wheels are mounted on the arbors or spindles with appropriate flanges, and may be dressed to any desired form with an ordinary abrasive stick.

♦ ♦ ♦

Twin Rail Carrier—Joy Mfg. Co., Franklin, Pa., recently brought out a twin rail system constructed with a swivel at track tread level, pro-



Joy twin rail carrier designed for industrial service

viding perfect carrier alignment, maximum traction and automatic embankment on curves. Twin rails, shown herewith, are supported on various types of fittings designed with a large factor of safety for varying loads and are constructed to meet overhead conveying conditions found in industrial manufacturing plants.

Support rods are adjustable to allow alignment of track. The twin rail, welded to the spacers, is sufficiently wide on ball surface to give ample traction, especially on electrified units where quick acceleration is desired. All joints are staggered to eliminate the pounding effect that results when rail joints are placed opposite each other.

Joy hand-propelled carriers are ruggedly constructed to withstand severe service. Floor and cage-controlled electrically-propelled carriers are designed especially for heavy-duty installation.

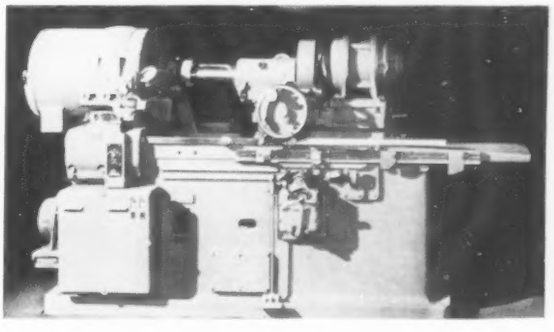
♦ ♦ ♦

Internal Grinder—Heald Machine Co., Worcester, Mass., recently developed an internal grinder arranged with a hollow type workhead for grinding single airplane cylinders, long sleeves and work of similar nature. This machine, shown herewith, is known as the style No. 73 airplane cylinder grinding machine. As an airplane cylinder is bolted to the engine by the flange and centralized by the turned diameter of the skirt, the fixture was designed to locate from these surfaces in order that the bore be ground absolutely at right angles to the flange and concentric with the outside diameter of the skirt.

In chucking the cylinder, an adapter ring is first bolted to the flange, then a bracket with a stud is fastened to the rear. The cylinder is then loaded into the workhead from the left hand end and is centralized by six locating pins. Guide bars guide it into position. Adapter ring is then clamped against three positive stops by hook clamped bolts operated from the front end and which lock the cylinder into the workhead so that the bore is concentric with the center line of the workhead and square with the flange.

A strap with a self-aligning end support is then slipped over the stud

ON THIS Heald internal grinder all switches and motor connections are contained in one terminal box. An inching switch permits the wheel spindle to be jogged around while setting up the machine



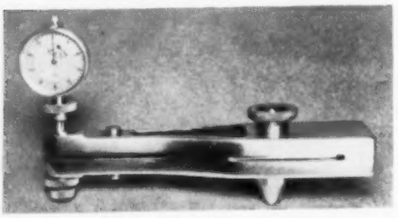
on the bracket at the rear and clamped to the workhead spindle. This acts simply as a support and steady rest against the wheel pressure and does not affect the alignment or location. Two adapter rings and brackets furnished with each machine enable the operator to prepare a cylinder while another is grinding.

General design of this machine is similar to other internal grinding machines built by the company. The base, however, is much heavier and with wider table ways which are pressure lubricated. The oil used in the hydraulic system for driving the table is enclosed in the base, keeping it free from grit and dirt.

The hole in the spindle is 10 inches in diameter providing room for all standard single airplane cylinders. Workhead drive motor is mounted on a suitable base plate that is carried on vibration dampeners fastened low on the rear of the base. A solenoid brake prevents excessive overrun. The cross slide has been made larger and heavier providing an exceptionally rigid support for the wheelhead. A 10-horsepower motor is mounted on the cross slide base separate from the cross slide thus preventing the transmission of vibration to the wheel spindle. In order to maintain the proper belt tension the motor and cross slide move together when feeding the wheel into the work.

♦ ♦ ♦

Portable Brinell Testing Unit—R. Y. Ferner Co., 930 Investment building, Washington, is marketing



Portable Brinell testing device marketed by R. Y. Ferner Co.

in the United States and Canada a new type of portable Brinell hardness testing instrument. The device, shown herewith, is adapted to the test of a wide range of hardness, from lead to hardened steel. It is designed for use in a drill press, an arbor press, on a lathe or planer, or in a vise or any other equipment by which the necessary pressures up to 750 kilograms can be applied. The heavy spring formed by the two prongs of a tapered piece of steel is used as the means of measuring the pressure applied. A screw inserted in the end of the lower prong makes contact with the plunger of a dial indicator mounted in the other prong and can be adjusted and locked in position to give a zero reading on the dial with no load.

A calibration of the instrument is furnished to show the readings of the dial corresponding to the usual loads of 750, 250, 187.5 and 62.5 kilograms. Balls of diameters of 2.5, 5 and 10 millimeters mounted in holders for insertion in the under side of the lower prong are supplied with the equipment, and a Morse cone holder and a square-shanked holder are supplied, in addition to the spherical knob used when the press is used in a vise. A magnifier with cam-shaped dial for reading the diameters of impressions and their Brinell numbers is supplied with the instrument, or one of the usual Brinell microscopes can be furnished, if preferred. A book of tables of the Brinell numbers corresponding to each 0.01 millimeter diameter of the impression for each of the above combinations of diameter of ball and load is furnished with each outfit.

♦ ♦ ♦

Arc Welding Electrode—Lincoln Electric Co., Cleveland, has announced a general purpose, heavily-coated electrode for welding mild steel with the shielded arc. According to the manufacturer, this electrode, designated as Fleetweld No. 7, effects pronounced welding economies. It is designed particularly for high-speed and single-pass welding and its arc characteristics are such that it is particularly suitable for welds where fit-up is apt to be poor.

The electrode is said to have a high burn-off rate and low splatter loss, providing exceptionally fast welding at low cost. The finished bead is smooth. Tests made on specimens of all-weld metal show the following characteristics: Tensile strength, 70,000-80,000 pounds per square inch; yield point, 55,000-60,000 pounds per square inch; elongation in 2 inches, approximately 20 per cent; and resistance to corrosion, greater than that of mild steel.

The coating is of special composition material, the metal drawn to rigid specifications, carefully selected and tested. The electrode is manufactured in the following diameters: 1/8, 5/32, 3/16, 7/32, 1/4, 5/16 and 3/8-inch in 14-inch lengths. The first three sizes are designed for welding in flat, vertical or overhead position, and the larger sizes for welding in flat position only. They are packed in square metal containers of 50-pound size.

♦ ♦ ♦

Oxyacetylene Cutting Blowpipe.—Linde Air Products Co., 30 East Forty-second street, New York, is announcing a new oxyacetylene cutting blowpipe, known as the Oxweld type

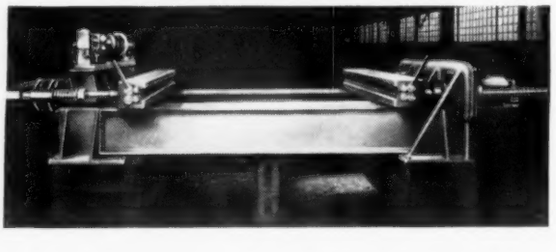
Oxweld oxyacetylene cutting blowpipe designated type C-24

C-24. The unit, shown herewith, has been designed essentially to serve as a general-duty cutting blowpipe, but is capable of doing heavier work if necessary, and will operate with less oxygen pressure than any preceding Oxweld cutting blowpipe. Some of its outstanding features are: An entirely new design of cutting oxygen valve, the valve being placed in an easily accessible position; a long external cutting valve lever which makes the valve easy to operate with the hand in normal gripping position; nozzles with seat protectors; closer spacing of the heating orifices about the cutting oxygen opening; new nozzle sizes; interchangeable large-capacity ball-type inlet-needle-valves; interchangeable low-pressure injector or medium-pressure mixer.

♦ ♦ ♦

Sheet Stretching Machine—Lewis Foundry & Machine Co., P. O. Box 1591, Pittsburgh, has placed on the market an improved sheet stretching machine, shown herewith. Stretching

IMPROVED sheet stretching machine developed by Lewis Foundry & Machine Co. has adjustable head.



ELECTRIC FURNACE OR OPEN HEARTH?

TIMKEN ALLOY STEELS OFFER EXCEPTIONAL PERFORMANCE IN EITHER GRADE

THE name of The Timken Steel and Tube Company is associated with the production of both electric furnace and open hearth alloy steels of the highest quality for every purpose.

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Specialists in the Production of Bearing Steel and Bearing Steel Tubing

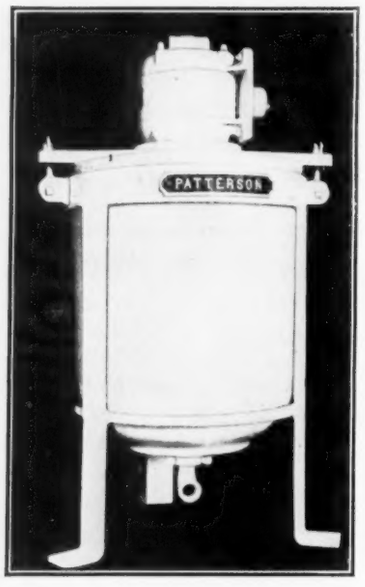
TIMKEN ALLOY STEELS

ELECTRIC FURNACE AND OPEN HEARTH • ALL STANDARD AND SPECIAL ANALYSES

equipment is a single unit mounted on top of hydraulically operated cylinders. The oil hydraulic pump is direct motor driven. Complete machine is portable and can be moved to any part of the plant. The adjustable head, totally enclosed with the gears running in oil, is so arranged that it can be easily adjusted for long and short shapes. This unit can be made in any length or width to meet requirements.

♦ ♦ ♦

Acid-Proof Mixer — Patterson Foundry & Machine Co., East Liverpool, O., recently placed on the market a new acid-proof, sanitary mixer for laboratory and small process work. The tank of the unit, shown herewith, is made of white Porox, glazed inside and out. It has a round bottom with monel metal outlet valve



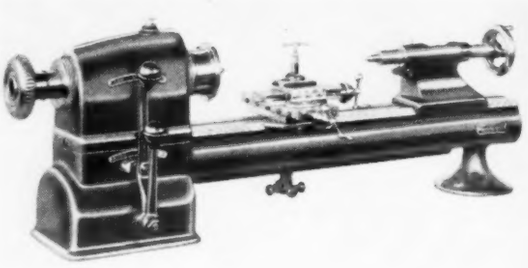
Patterson acid-proof mixer for laboratory, small process work

flush with the bottom inside. Vertical shaft and propeller-type stirrers also are made of monel. Two sizes are available, one having a total capacity of 6 gallons and the other 12 gallons; operating capacity is 5 to 10 gallons respectively. Size of agitator for each is 1/6 horsepower.

♦ ♦ ♦

Enclosed Head Bench Lathe—Hardinge Bros. Inc., Elmira, N. Y., now offers a new line of precision motor driven bench lathes designed along modern lines with speed change control levers at head of machine. Heavier cuts and simplified operations are possible with the new

ENCLOSED head precision bench lathe designed by Hardinge Bros. Inc., is featured by ease of operation and elimination of moving belts above the bench



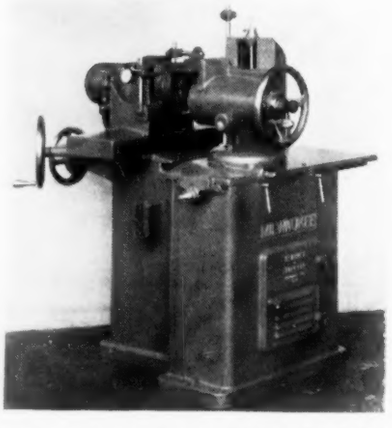
units, shown herewith. Conveniently located lever control are provided for speed changes. Construction allows high spindle speeds and an engine lathe design tailstock are additional features.

Headstock frame is cast in one piece in order to enclose three driving V-belts. The speed change levers operate electrical controls to a drive which gives six forward and six reverse spindle speeds without the use of driving gears, clutches or loose pulleys. These bench lathes are offered in five sizes varying from ½ to 1-inch collet capacity, 7 and 9-inch swing, for bench or cabinet mounting.

♦ ♦ ♦

Face Mill Grinder—Kearney & Trecker Corp., Milwaukee, has introduced a new face mill grinder, basically designed for rapid sharpening of tungsten and tantalum carbide milling cutters. This new unit, shown herewith, is a heavy-duty machine with a capacity to sharpen all face mill cutters up to 16 inches in diameter.

The cutter spindle is large in diameter and has a No. 50 national standard spindle nose, the same as the milling machine, so that any cutter mounted on a style C arbor can be sharpened without removing the



Face mill grinder developed by Kearney & Trecker Corp.

arbor. Larger diameter cutters are bolted on to the spindle nose, thereby making adapters unnecessary. The cutter spindle housing is large in size and is mounted on a rugged upright that can be swiveled to any desired angle.

Graduated dials on all adjustment screws make setups simple and accurate. A jeweled-bearing dial indicator, reading to half-thousandths, is furnished as standard equipment. The indicator is permanently mounted on the wheel spindle slide directly in front of the operator. With this indicator it is possible to quickly check the accuracy of the finished cutter, as well as to check the cutter before grinding to see if it has been run too long and become wastefully dull.

Wheel spindle is large in diameter. The 55-pound, flywheel is solidly mounted on the spindle between the front and center bearings. Inertia of the flywheel provided on the spindle keeps the abrasive wheel running smoothly and maintains a uniform speed at all times. The effects are threefold: There is less wheel wear, a uniform amount of stock is removed from each blade, and the time for completely sharpening a cutter is greatly reduced.

A spindle brake is provided on the machine so the operator can quickly stop the spindle after turning off the motor. The brake consists of a raybestos-lined shoe which contacts the flywheel when the operator pushes in on the large button provided on the side of the spindle housing.

♦ ♦ ♦

Paint Fluid Hose—Electric Hose & Rubber Co., Wilmington, Del., recently introduced a new type of paint fluid hose which successfully resists all commercial solvents. The product is made of a newly developed compound possessing all the strength and flexibility of rubber, but being free of the usual tendency to soften, slough off, break apart or disintegrate when in contact with oils or solvents. The hose, of braided and molded construction, is light and flexible and its cover will resist rough wear.

Metal Guild Holds First Meeting

FIRST technical meeting of the Electric Metal Makers Guild was held at the Pittsburgh Athletic association, Pittsburgh, June 29 and 30.

Attending the meeting were: Herman Schulz, Illinois Steel Co., Chicago; A. E. Kayes, International Nickel Co. Inc., Huntington, W. Va.; J. A. Scott, Driver-Harris Co., Harrison, N. J.; Leroy Bash, Timken Steel & Tube Co., Canton, O.; David J. Giles, Latrobe Electric Steel Co., Latrobe, Pa.; John S. Williams, Reading Steel Casting Co., Reading, Pa.; J. H. Chivers, Crucible Steel Co. of America, Park works, Pittsburgh; Harry F. Walther, Timken Steel & Tube Co.

J. A. deBondy, Manitoba Steel Foundries, Selkirk, Manitoba, Canada; Fred B. Anderson, United States navy yard, Portsmouth, Va.; F. J. Blaney, Ohio Steel Foundry Co., Springfield; M. M. Townsend, Atha works, Crucible Steel Co. of America, Harrison, N. J.; A. D. Potts, Simonds Saw & Steel Co., Lockport, N. Y.; Alex C. Texter, Canadian Atlas Steel Co., Welland, Ont., Canada; F. M. Hicks, Henry Disston & Sons, Philadelphia; R. S. Read, Halcomb Steel Co., Syracuse, N. Y.; Bert J. Aamodt, National Malleable & Steel Casting Co., Chicago; L. B. Knox, Firth-Sterling Steel Co., McKeesport, Pa.; J. N. Brookfield, Ludlum Steel Co., Dunkirk, N. Y.; and W. B. Wallis, Pittsburgh.

Officers Are Elected

At the business meeting of the Guild, A. E. Kayes of the International Nickel Co. Inc. was elected president, R. S. Read of the Halcomb Steel Co. was elected vice president, and Joseph A. Scott of the Driver-Harris Co. was elected secretary-treasurer.

The meeting on June 29 was devoted to a technical session on slags, a paper being read by Mr. Kayes. A paper also was read by Mr. Giles of the Latrobe Electric Steel Co. on "Ingot Mold Design." On June 30 a paper was read by J. H. Chivers of the Crucible Steel Co. of America on the subject of "Basic Practice." There was considerable discussion on all of these papers and on June 30 a large part of the time for discussion was devoted to the use of alloys in steel under the subject of "Furnace Practice."

The first technical meeting, following the organization meeting at Chicago, showed an increase in growth from 13 charter members at the organization meeting last year to 27 members, with a number of applications for membership pending.

It is proposed to have the next annual meeting at the same place and approximately the same time as the meeting of the open hearth committee of the American Institute of Mining and Metallurgical Engineers.

General offices are: Electric Metal Makers Guild, c/o J. A. Scott, secretary-treasurer, 166 Tappan avenue, Belleville, N. J.

Builds Improved Type Rotary Hearth Forging Furnace

(*Concluded from Page 26*)

In practice, depending upon local conditions, a furnace atmosphere containing from 0.5 to 1.5 per cent CO and O_2 should be maintained to insure heating the steel with a minimum of scale and surface decarburization, also using a minimum of fuel.

In the water sealed and syphon vented rotary forge furnace, the burners are located sufficiently high above the stock to provide thorough combustion before the gases contact the stock. Such products of combustion constitute a most effective protection against scaling. In this manner the atmospheric conditions described previously are held.

Rapid and uniform heating is assured as the slugs are placed directly upon the hearth which is at furnace temperature the underside of the slug is heated by conduction while the exposed sides and top are heated by radiation; this it is said, also insures minimum internal strains.

The temperature of the heating chamber is maintained only slightly higher than that to which the stock is heated and this small temperature gradient between the stock and the furnace temperature under normal conditions eliminates the formation of slag. The method of applying heat insures a uniform rate of heat penetration and the inner core of the slug is brought to temperature without customary washing or dripping of the sharp edges of the slug.

Single Opening Cuts Drafts

A common opening is used for charging and discharging stock; this common opening minimizes black body radiation losses and eliminates atmospheric drafts through the furnace. One operator handles the product to and from the furnace; the operator being protected from the heat at the charging opening by a water-cooled shield and an air curtain pipe.

The circular construction of the heating chamber provides a minimum wall area, which, it is claimed, results in low stand-by losses and high net thermal efficiency. Burners are located in the furnace sidewall and the stock on the rotating hearth passes through the hottest portion of the heating chamber just prior to reaching the discharge position. The flow of hot gases is counterclockwise to the direction of table travel, thus these gases are held in the heating chamber until a maximum amount of heat has been extracted.

The furnace is completely equipped with burners, blowers, full automatic proportioning temperature control and mechanism for rotating the hearth. The motive power for operating the table is built for heavy-duty service and includes variable-speed transmission. The entire mechanism is easily accessible for adjustment or repair. No pits or special foundations are required for this type of furnace; it is a self-contained unit which may be moved from one location to another.

One of these furnaces, a unit which will heat 3500 pounds of steel per hour to forging temperatures, has been built by the Gas Machinery Co. in the No. 2 works of the East Ohio Gas Co., Cleveland. This furnace is used for demonstration purposes and already a number of test runs have been made with it.

Trade Publications

CONTROLLER—A controller for temperature and pressure is described in a bulletin by the Foxboro Co., Foxboro, Mass., with full illustrated description of its construction and operation.

VOLTAGE REGULATOR—The transformer-commutator principle for voltage control in alternating current circuits is described in a publication, bulletin No. 1175 of the American Transformer Co., 178 Emmett street, Newark, N. J. Illustrations and basic circuit diagrams accompany the text.

MATCHED THREADS—Precision of tools used in cutting threads on pipe and in couplings is treated at length in a new booklet, No. 18, by the Youngstown Sheet & Tube Co., Youngstown, O. Use of the most exact methods for producing threads that will match exactly is shown in detail and the results attained in the threads are illustrated.

LEVELING EQUIPMENT — Aetna-Standard Engineering Co., Younstown, O., in its bulletin No. 1, describes its leveling and straightening equipment for plates, sheets, bars, strip, tin plate, tubes, pipe and shapes. This is the first of a series and illustrates a few selections from the company's line of equipment. Illustrations tell most of the story.

STAINLESS STEEL—A booklet on its Enduro 18-8 stainless steel has been issued by Republic Steel Corp., Youngstown, O. It contains data on this steel and the series of types related to it. A table of laboratory corrosion data is also presented, listing the degree of corrosion resistance to more than 300 chemical reagents, solutions and products

(*Please turn to Page 74*)

IN its modern by-product plants in Chicago, Toledo, Erie and Duluth, Interlake Iron Corporation operates 402 coke ovens having a yearly capacity of over 2,000,000 net tons of coke for blast furnace, foundry, industrial and domestic uses.

PIG IRON . . . *All Grades*
FEDERAL PERRY TOLEDO ZENITH

COKE . . *Foundry, Industrial and Domestic Uses*
CHICAGO SOLVAY PERRY TOLEDO ZENITH

INTERLAKE IRON

CORPORATION

PLANTS CHICAGO DULUTH TOLEDO ERIE

PIG IRON

PICKANDS MATHER & CO. SALES AGENTS

CLEVELAND CHICAGO DETROIT ERIE TOLEDO MINNEAPOLIS DULUTH

COKE

Price Cuts Spread to Nearly All Steel Products

Consumers, Cautious, Wait for Market To Stabilize—Steel Rate Likely To Rebound This Week—June Pig Iron and Steel Ingot Production Down

SWEEPING price reductions were announced last week by the steel industry, following the readjustments previously made on sheets, strip, bars and other products used chiefly by automobile manufacturers.

Practically all classifications of steel have now been affected. Reductions of $2 a ton were made in sheet bars, billets and slabs, enameling sheets, tin mill black sheets, iron bars, alloy steel billets, blooms and bars. Reductions of $4 a ton apply to long terne plates, hot-rolled pickled in the breakdown sheets known as the Ford "special," and cold rolled strip. Galvanized sheets have been reduced $3 a ton, and shapes and plates $1 a ton.

So far, wire and wire products and reinforcing bars have escaped, as have rails and track accessories, which, however, were not advanced in April. The general extent of the readjustments may be gaged by STEEL's finished steel price composite which is down $1.40 to $54.10, though still $3 higher than the level at which most of the second quarter orders were booked. The iron and steel composite is off 83 cents to $34.23, but this is $1.83 above the point at which those orders were taken.

First Price Cuts Take Automobile Orders; Not All Consumers Are Satisfied

To some consumers who stocked up in June in anticipation of the higher advances announced for third quarter the readjustments do not appear as immediately beneficial, as they now have on hand materials which in many instances they could replace at lower figures, considering carrying charges. The possibility of having to meet lower prices for finished manufactured products made from steel likewise does not appeal to many users. The government's order permitting bidders on federal work to cut code prices 15 per cent, with the stipulation that such prices become general to the public is not interpreted in the industry as applying to steel.

Steel demand has felt the full force of the reaction from the June peak, while the price reductions are causing buyers to remain out of the market so long as possible until assured of its stability. Considerable tonnage from automobile manufacturers was booked by those producers who took the initiative in announcing reductions. The general opinion in the industry, however, is that a broad improvement in buying will not be felt until August. Automobile manufacturers placed $20,000,000 to $30,000,000 worth of orders for dies in preparation for new models.

Railroad requirements apparently have passed the year's peak. June freight car awards—1835—brought the total for the half year to 23,259, highest since the same period in 1930. Informal inquiries indicate 6000 to 8000 may still be purchased this year.

Steel Rate Expected To Pull Out of Holiday Slump; 25 Blast Furnaces Off in June

Structural shape awards for the week dropped to 12,430 tons. Bids will be opened July 9 on 16,150 tons of steel piling for the Fort Peck, Mont., dam, the largest permanent installation of steel piling in this country. San Francisco has awarded 9300 tons of cast pipe.

Pig iron producers are trying hard to retain their advance of $1 a ton for third quarter, with consumers heavily stocked. Several blast furnaces were blown out last week, and some coke shipments have been suspended. STEEL's iron and steel scrap composite holds at $10.37 for the third consecutive week, with little trading in the market.

Steelworks operations receded last week to an artificial low of 22 per cent, but a rebound to at least 33 per cent is expected this week.

Daily average pig iron production in June—64,563 gross tons—was 2.7 per cent below May, while output for the month—1,936,897 tons—was down 5.8 per cent. The industry made 9,852,608 tons in the first six months, 121 per cent more than in the first half last year. June closed with 92 stacks in blast, a net loss of 25.

Daily average steel ingot output for June, 103,724 gross tons, was 16.5 per cent less than in May, while total output of 3,015,972 was 10 per cent less than for May. Production for the first six months was 16,180,889 tons, compared with 8,989,192 tons in the first half of 1933.

COMPOSITE MARKET AVERAGES

	July 7	June 30	One Month Ago June, 1934	Three Months Ago April, 1934	One Year Ago July, 1933	Ten Years Ago July, 1924
Iron and Steel Composite	$34.23	$35.06	$34.89	$34.18	$29.81	$39.78
Finished Steel Composite	54.10	55.50	55.08	53.90	47.20	63.53
Steelworks Scrap Composite	10.37	10.37	10.32	12.15	10.66	14.87

Iron and Steel Composite:—Pig iron, billets, slabs, sheet bars, wire rods, tin plate, nails, sheets, plates, shapes, bars, and black pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	July 7, 1934	June, 1934	April, 1934	July, 1933
Finished Material				
Steel bars, Pittsburgh	1.80	1.90	1.85	1.60
Steel bars, Chicago	1.85	1.95	1.90	1.70
Steel bars, Philadelphia	2.09	2.19	2.15¼	1.91
Iron bars, Terre Haute, Ind.	1.75	1.85	1.60	1.65
Shapes, Pittsburgh	1.80	1.85	1.80	1.60
Shapes, Philadelphia	2.00½	2.05½	2.01¾	1.81½
Shapes, Chicago	1.85	1.90	1.85	1.70
Tank plates, Pittsburgh	1.80	1.85	1.80	1.60
Tank plates, Philadelphia	1.98½	2.03½	1.99¾	1.79½
Tank plates, Chicago	1.85	1.90	1.85	1.70
Sheets, No. 10, hot rolled, Pitts.	1.85	2.00	1.90	1.75
Sheets, No. 24, hot ann., Pitts.	2.45	2.65	2.50	2.25
Sheets, No. 24, galvan., Pitts.	3.10	3.25	3.10	2.85
Sheets, No. 10, hot rolled, Gary	1.95	2.10	2.05	1.80
Sheets, No. 24, hot anneal., Gary	2.55	2.75	2.65	2.35
Sheets, No. 24, galvan., Gary	3.20	3.35	3.25	2.95
Plain wire, Pittsburgh	2.30	2.30	2.25	2.10
Tin plate, per base box, Pitts.	5.25	5.25	5.25	4.25
Wire nails, Pittsburgh	2.60	2.60	2.50	2.05
Semifinished Material				
Sheet bars, open-hearth, Youngs.	$28.00	30.00	28.40	26.00
Sheet bars, open-hearth, Pitts.	28.00	30.00	28.40	26.00
Billets, open-hearth, Pittsburgh	27.00	29.00	27.80	26.00
Wire rods, Pittsburgh	38.00	38.00	37.20	35.00

	July 7, 1934	June, 1934	April, 1934	July, 1933
Pig Iron				
Bessemer, del. Pittsburgh	19.76	19.76	19.56	17.86
Basic, Valley	18.00	18.00	17.60	15.60
Basic, eastern, del. eastern Pa.	19.76	19.76	19.51	16.79
No. 2 foundry, del. Pittsburgh	19.26	19.26	19.06	17.36
No. 2 foundry, Chicago	18.50	18.50	18.25	16.75
Southern, No. 2, Birmingham	14.50	14.50	14.25	12.60
No. 2X, Eastern del. Philadelphia	20.63	20.63	20.38	17.28
Malleable, Valley	18.50	18.50	18.10	16.10
Malleable, Chicago	18.50	18.50	18.25	16.75
Lake Superior charcoal, del. Chi.	23.54	23.54	23.54	23.04
Gray forge, del. Pittsburgh	18.88	18.88	18.68	16.93
Ferromanganese, del. Pittsburgh	89.79	90.00	90.24	84.44
Scrap				
Heavy melting steel, Pittsburgh	$12.00	11.90	14.15	12.70
Heavy melt. steel, No. 2, east. Pa.	9.00	8.87	9.50	9.35
Heavy melting steel, Chicago	9.75	9.75	11.75	10.45
Rails for rolling, Chicago	11.25	11.25	12.75	11.15
Railroad steel specialties, Chi.	11.25	11.25	12.75	11.15
Coke				
Connellsville, furnace, ovens	3.60	3.60	3.30	2.40
Connellsville, foundry, ovens	4.60	4.60	4.55	2.85
Chicago, by-product foundry, del.	9.25	9.25	9.25	8.00

Steel, Iron, Raw Material and Metals Prices

Prices conform to American Iron and Steel institute schedules

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.85c
Gary, base	1.95c
Chicago, del.	1.98c
New York, del	2.18c
Philadelphia, del.	2.14c
Birmingham, base	2.00c
St. Louis, del.	2.17c
F.o.b. cars, dock, Pacific ports	2.40c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.45c
Gary, base	2.55c
Chicago, del.	2.58c
Detroit, del.	2.65c
New York, del.	2.78c
Philadelphia, del.	2.74c
Birmingham, base	2.60c
St. Louis, del.	2.77c
F.o.b. cars, dock, Pacific ports	3.05c

GALVANIZED No. 24

Pittsburgh, base	3.10c
Gary, base	3.20c
Chicago, del	3.23c
Philadelphia, del.	3.39c
New York, del.	3.43c
Birmingham, base	3.25c
St. Louis, del	3.42c
San Francisco, f.o.b. cars, dock	3.70c

TIN MILL BLACK No. 28

Pittsburgh, base	2.75c
Gary, base	2.85c
St. Louis, del.	3.07c

COLD ROLLED No. 10

Pittsburgh, base	2.50c
Gary, base	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.79c
New York, del	2.83c
F.o.b. cars, dock, Pacific ports	3.10c

COLD ROLLED No. 20

Pittsburgh, base	2.95c
Gary, base	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.24c
New York, del	3.28c

ENAMELING SHEETS

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh. Gary base, 10 cents higher

Tin plate, coke base contract	$5.25
Do., stock	$4.90
Long ternes, No. 24 unassorted	3.45c

Corrosion and Heat Resistant Alloys

Base, Pittsburgh

18% chrome, 8% nickel; sheets 35c; plates, 28c; bars, 24c; hot-rolled strip, 24.50c; cold-rolled strip, 2.00c.

	A	B	C	D
Bars	17c	18.5c	21c	26c
Plates	20c	21.5c	24c	29c
Sheets	25c	28c	31c	35c
Hot strip	17c	18.5c	21c	26c
Cold strip	22.5c	24c	27c	35c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 19/23% inc., D over 23/30%.

Steel Plates

Pittsburgh, base	1.80c
New York, del	2.08c
Philadelphia, del.	1.98½c
Boston, del.	2.20c
Buffalo, del.	2.03½c
Chicago or Gary base	1.85c
Cleveland, del.	1.98½c
Birmingham, base	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific Coast, f.o.b. cars, dock	2.35c
St. Louis, del.	2.07c

Structural Shapes

Pittsburgh, base	1.80c
Philadelphia, del	2.00½c
New York, del.	2.05¼c
Boston, del.	2.18½c
Bethlehem, base	1.90c
Chicago, base	1.85c
Cleveland, del.	1.98½c
Buffalo, base	1.85c
Gulf ports	2.20c
Birmingham, base	1.95c
Pacific Coast, f.o.b. cars, dock	2.35c

Bars

SOFT STEEL

Pittsburgh, base	1.80c
Chicago or Gary	1.85c
Duluth, base	1.95c
Birmingham, base	1.95c
Cleveland, base	1.85c
Buffalo	1.90c
Detroit, del.	1.95c
Pacific Coast ports cars, dock, c.i.f.	2.35c
Philadelphia, del.	2.09c
Boston, del.	2.20c
New York, del.	2.13c
Pitts., forg. qual	2.95c-2.55c

RAIL STEEL
To Manufacturing Trade

Pittsburgh base	1.70c
Chicago or Gary, base	1.75c
Moline, Ill., base	1.75c
Cleveland, base	1.75c
Buffalo, base	1.80c

IRON

Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia, base	1.89c
Pittsburgh, refined	2.75c-7.50c

REINFORCING

New billet, cut lengths, carlots

Pittsburgh	2.05c
Chicago, Gary, Buffalo Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports	2.50c
Philadelphia, del.	2.34c

Rail Steel

Pittsburgh, base	1.90c
Chicago, Buffalo, Cleveland, Birm., Young	1.95c
Gulf ports	2.30c
Pacific coast ports	2.45c

Wire Products □ □

(Prices apply to straight or mixed carloads; pool cars, or less, 10c up. 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base, Pittsburgh-Cleveland
(Per 100-lb. keg)

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
Do., 16 gage and finer	5.10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire	3.20c

Chicago and Waukegan $1 higher, Worcester $2 higher.

Cold-Finished Carbon Bars and Shafting □ □

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs. and over	1.97½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars □

Hot Rolled

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	5.80
2500	2.25	3400	3.20
4100 .15 to .25 Mo.		Mo.	0.50
4600 .20 to .30 Mo. 125-1.75 Ni.			1.05
5100 .80-1.10 Cr.			0.45
5100 Cr. spring			base
6100 bars			1.20
6100 spring			0.70
Cr., Ni., Van.			1.50
Carbon van.			0.95
9250...Carbon base plus extras			

Strip and Hoops □

Hot strip to 23⅝-in. Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham, base	2.00c
Detroit, delivered	2.05c
Phila., delivered	2.14c
New York, del	2.18c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip, Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material □

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts. 24-45 lbs.	$27.00
50-60 lbs.	$24.00
70-75 lbs.	$18.00
80-85 lbs.	$25.00
100 lbs.	$26.00
Light rails, billet qual., Pittsb., Chi.	$35.00
Do., reroll. qual.	$34.00
Angle bars, mills	2.55c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs., up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots. Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thread	70 off
Rolled thread, ½ x 6 and smaller	70 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts, without nuts	70 off
Tire bolts	60 off
Stove bolts, 75 off in pkgs.; 83 off in bulk, 15,000 or more of a size.	
Rolled thread machine bolts, ½x6 and smaller,	70 off
Step bolts	66 off
Elevator bolts	66 off

NUTS

Semifinished	70 off

HEXAGON CAP SCREWS

Milled	80-10-10 off
Upset 1-in., smaller	85 off

SQUARE HEAD SET SCREWS

Upset, 1-in., smaller	75-10 off
Do., larger than 1-in.	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., C. l., Pittsburgh, Cleveland	3.00c
Struc., c. l., Chicago	3.10c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila.	6.00 off

Cut Nails □ □

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. less than 5 kegs; no discount on size extras	$3.20

Piling □ □

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

Steel

In.	Blk.	Gal.
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

LAP WELD

Steel

2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

LINE PIPE

Steel

½-in. butt weld	57½
⅝-inch, but weld	50½
¼—⅜-in. buttweld	52½
¾-in. butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63

Iron

⅛—1½-inch, black and galv. take 4 pts., over; 2½—6-inch 2 pts. over discounts for same sizes, standard pipe lists. 8—12-inch, no extra.

BOILER TUBES

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¾—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 2000 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron; 10,000 pounds to carloads, base less 5%; under 10,000 pounds, two points under base only.

SEAMLESS BOILER TUBES

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe □

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$38.00-39.00
4-in., Birmingham	41.00-42.00
4-in., Chicago	49.00-50.00
6 to 24-in., Chicago	46.00-47.00
3-in & over, east fdy	42.00
Do., 4-in.	45.00
Class A pipe $2 over Class B.	
Stnd. fitgs., Birm. base	$100.00

Semifinished Steel □

BILLETS AND BLOOMS

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.30
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

SHEET BARS

Pitts., Cleve., Young., Chi., Buff., Canton, O., and Sparrows Point, Md.	28.00

SLABS

Pitts., Cleve., Young.	27.00

WIRE RODS

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

SKELP

Pitts., Chicago	1.70c

Coke □ □ □

Price Per Net Ton

BEEHIVE OVENS

Connellsville Fur.	$3.60- 3.85
Connellsville fdry	4.60
Connell, prem, fdy	5.35
New River fdry	6.00
Wise county fdry	4.25- 5.00
Wise county fur.	3.50- 4.25

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.71- 9.31
Chi., ov., outside del.	8.50
Chicago, del	9.25
New England, Del.	10.50
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.50
Philadelphia, del.	9.00

Coke By-Products □

Per gallon, producers' plants, Tank lots

	Spot
Pure benzol	$0.19
90 per cent benzol	$0.19
Toluol	0.30
Solvent naphtha	0.26
Commercial xylol	0.26

Per lb. f.o.b. New York

Phenol (200 lb. drums)	0.163c
Do. (100 lbs.)	0.173c

Eastern Plants, Per Pound,

†Naphthalene flakes and balls, in bbl.	6.00

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.25

†Western prices ½-cent up.

Pig Iron

Delivered prices do not include switching charges except as noted. No. 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25. Gross tons.

BASING POINTS:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	.....	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Granite City, Ill.	18.50	19.00	18.00	.....
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
DELIVERED FROM BASING POINTS:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.02	.....	19.90	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.77	22.27	.....	.....
Brooklyn, N. Y., from Bmghm.	21.39	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.13	.....	19.01	.....
Cleveland from Birmingham	18.62	.....	18.50	.....
Indianapolis from Hamilton, O.	20.77	20.77	20.27	21.27
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.50	19.50	19.00	20.00
Muskegon, Mich., from Chicago, Toledo or Detroit	21.40	21.40	20.90	21.90
Newark, N. J., from Birmingham	20.51	.....	.....	.....
Newark, N. J., from Bethlehem	20.89	21.39	.....	.....
Philadelphia from Birmingham.	19.88	.....	19.76	.....
Philadelphia from Swedeland, Pa.	20.26	20.76	19.76	.....
Pittsburgh dist. from Neville Island	(Neville Island base, plus 63c, 76c and $1.13 switching chgs.)			
Saginaw, Mich., from Detroit	20.60	20.60	20.10	21.10
St. Louis from Granite City, Ill.	19.00	19.50	18.50	.....
St. Louis from Birmingham	18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

LOW PHOS.

Basing Points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$23.50. Basing Point: †Johnson City, Tenn.—$23.50 †Off grade material is $19.50

Philadelphia, standard and copper bearing 24.63

GRAY FORGE		CHARCOAL	
Valley furnace	18.25	Lake Superior fur.	21.00
Pitts. dist. fur.	18.25	Do., del. Chicago	24.04

SILVERY†

Jackson County, O., base; 6%—$22.75; 7—$23.75; 8—$24.75; 9—$25.75; 10—$26.75; 11—$27.75. Buffalo base prices $1.25 higher.

BESSEMER FERROSILICON†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

EASTERN LOCAL ORES

Cents, unit, del. E. Pa.

Foundry and basic, 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

FOREIGN ORE

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. & low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos.	9.50
Spanish No. Africa basic, 50 to 60%..	9.00
Tungsten, spot, sh. ton unit, duty pd.	$17.25-17.75
N. F. fdy., 55%.....	7.00
Chrome ore, 48% gross ton, c.i.f.....	$18.00

Manganese Ore

(Nominal)

Prices, not including duty, cents per unit, cargo lots.

Caucasian, 52-55%	24.00
So. African, 52%....	24.00
So. Afr., 49-51%....	22.00
Indian, 58-50%	nominal
Indian, 48-50%	nominal

Refractories

Per 1000 f.o.b. Works

FIRE CLAY BRICK

First Quality

Pa., Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	48.00

Second Quality

Pa., Ill., Ky., Md., Mo., Ga., Ala.	40.00

Ohio

First quality	$40.00
Intermediary	36.00
Second quality	25.00

MALLEABLE BUNG BRICK

All bases	50.00

SILICA BRICK

Pennsylvania	$45.00
Joliet, E. Chicago....	54.00
Birmingham, Ala....	52.00

MAGNESITE

Dead burned grain, Chester, Pa., Baltimore bases, net	40.00
Do., imported, at Chester, Baltimore	45.00
Domes, Chewelah, Wash., base	22.00

BASIC BRICK

Net ton, f.o.b. Baltimore, Plymouth Meeting, Pa. Chester, Pa.

Magnesite brick	$65.00
Chrome brick	45.00
Chemically bonded magnesite	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$19.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$17.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base..	85.00
Do., del. Pittsburgh	89.79
Spiegeleisen, 19-20%, dom. fur. spot†..	26.00
Ferrosilicon 50%, freight all., cl.	77.50
Do., less carload..	85.00
Do., 75 per cent..	126-130.00
Spot, $5 a ton higher.	
Silicomang., 2½ carb.	90.00
2% carbon	95.00
1% carbon	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton..	7.50
Ferrophosphorus, per ton, c. l., 17-19%, Rockdale, Tenn., basis, 18%, $2 unitage	42.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	55.00
Ferromolybdenum, stand. 50-60%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous Mill Products

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 9.00c *Conn. copper*

Sheets

Yellow brass (high)	14.50
Copper, hot rolled....	16.00
Lead, cut, to jobbers	7.05
Zinc, 100-lb base....	9.50

Tubes and Pipes

High yellow brass..	17.00
Seamless copper	17.25

Rods

High yellow brass..	13.00
Copper, hot rolled..	13.25

Anodes

Copper untrimmed..	13.75

Wire

Yellow brass (high)	15.00

Old Metals

Deal, buying prices, cents lb.

No. 1 Composition Red Brass	
New York	4.75- 5.00
Chicago	4.50- 4.75
Cleveland	5.00- 5.25
St. Louis	4.75- 5.00
Heavy Copper and Wire	
New York	6.25- 6.50
Chicago, No. 1	6.25- 6.50
Cleveland	5.75- 6.00
St. Louis	5.50- 5.75
Composition Brass Borings	
New York	4.50- 4.75
Light Copper	
New York	5.12½-5.37½
Chicago	5.00- 5.25
Cleveland	5.00- 5.25
St. Louis	4.75- 5.00
Light Brass	
Chicago	2.50- 2.75
Cleveland	2.75- 3.00
Lead	
New York	2.87½-3.12½
Cleveland	2.75- 2.90
Chicago	2.75- 3.00
St. Louis	3.00- 3.15
Zinc	
New York	2.00- 2.25
Cleveland	2.00- 2.25
St. Louis	2.50- 2.75
Aluminum	
Clips, soft, Cleve....	12.00-12.50
Borings, Cleveland..	6.00- 6.25
Mixed, cast, Cleve..	9.25- 9.75
Mixed cast, St. L.	9.00-10.00

Secondary Metals

Brass ingot, 85-5-5-5	8.75
Stand. No. 12 Alum.	14.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	9.00-10.00
Boston, dealers	5.75- 6.00
Buffalo, No. 1	11.00-11.50
Buffalo, No. 2	9.50-10.00
Chicago, No. 1	9.50-10.00
Cleveland, No. 1	9.00- 9.50
Cleveland, No. 2	8.50- 9.00
Detroit, No. 1	8.00- 8.50
Detroit, No. 2	7.00- 7.50
Eastern Pa.	10.50
Eastern Pa., No. 2	9.00
Federal, Ill.	6.75- 7.00
Granite City, R. R.	7.50- 8.00
Granite City, No. 2	6.50- 7.00
N. Y., deal. R. R.	7.00- 8.00
N. Y., deal. No. 2	5.50- 6.50
Pittsburgh, No. 1	11.75-12.25
St. Louis	6.75- 7.00
Valleys, No. 1	11.50-12.00

COMPRESSED SHEETS

Buffalo, dealers	9.50-10.00
Chicago, factory	8.50- 9.00
Cleveland	8.50- 9.00
Detroit	8.00- 8.50
E. Pa., new mat.	9.50-10.00
Pittsburgh	11.25-11.75
St. Louis	5.00- 5.50
Valleys	11.00-11.50

BUNDLED SHEETS

Buffalo	7.00- 7.50
Cincinnati, del.	6.50- 7.00
Cleveland	7.00- 7.50
Pittsburgh	10.25-10.75
St. Louis	4.00- 4.25

SHEET CLIPPINGS LOOSE

Chicago	5.00- 5.50
Cincinnati	5.00- 5.50
Detroit	4.50- 5.00
St. Louis	3.75- 4.25

STEEL RAILS, SHORT

Birmingham	10.50-11.50
Buffalo	13.00-13.50
Chicago (3 ft.)	11.00-11.50
Chicago (2 ft.)	11.50-12.00
Cincinnati, del.	10.50-11.00
Detroit	10.00-10.50
Pitts., open-hearth, 3 ft. and less	14.00-14.50
St. Louis, 2 ft.& less	9.50-10.00

STEEL RAILS, SCRAP

Boston	5.75- 6.00
Chicago	9.50-10.00
Pittsburgh	11.75-12.25

STOVE PLATE

Birmingham	7.00- 8.00
Boston, dealers	3.25- 3.75
Buffalo	8.50- 9.00
Chicago, net	7.00- 7.50
Cincinnati, dealers	5.00- 5.50
Detroit, net	6.00- 6.50
Eastern Pa.	8.50
N. Y., deal. fdry	6.00
St. Louis	6.00- 6.50

COUPLERS, SPRINGS

Buffalo	13.00-13.50
Chicago, springs	11.00-11.50
Eastern Pa.	13.50-14.00
Pittsburgh	13.75-14.25
St. Louis	8.00- 8.50

ANGLE BARS—STEEL

Chicago	10.50-11.00
St. Louis	7.75- 8.25

LOW PHOSPHORUS

Buffalo, billets and bloom crops	13.00-14.00
Cleveland, billet, bloom crops	13.00-13.50
Eastern Pa. crops	15.00-15.50
Pittsburgh, billet, bloom crops	14.50-15.00
Pittsburgh, sheet bar crops	13.50-14.00

FROGS, SWITCHES

Chicago	9.50-10.00
St. Louis, cut	8.00- 8.50

SHOVELING STEEL

Chicago	9.50-10.00
Federal, Ill.	6.75- 7.00
Granite City, Ill.	6.75- 7.00

RAILROAD WROUGHT

Birmingham	6.50- 7.00
Boston, dealers	6.00- 6.50
Buffalo, No. 1	7.50- 8.00
Buffalo, No. 2	11.00-11.50
Chicago, No. 1 net	8.25- 8.75
Chicago, No. 2	9.50-10.00
Cincinnati, No. 2	7.50- 8.00
Eastern Pa.	10.00-10.50
N. Y., No. 1 deal.	7.25- 7.75
St. Louis, No. 1	6.50- 7.00
St. Louis, No. 2	7.50- 7.75

SPECIFICATION PIPE

Boston	4.50- 4.75
Eastern Pa.	9.00
New York, dealers	3.50- 3.75

BUSHELING

Buffalo, No. 1	9.50-10.00
Chicago, No. 1	8.50- 9.00
Cinci., No. 1 deal.	6.00- 6.50
Cincinnati, No. 2	7.00- 7.25
Cleveland, No. 2	7.00- 7.25
Detroit, No. 1 new	7.00- 7.50
Valleys, new No. 1	11.00-11.50

MACHINE TURNINGS

Bimingham	4.50- 5.00
Boston, dealers	1.75- 2.00
Buffalo	4.50- 5.00
Chicago	5.50- 6.00
Cincinnati, dealers	4.50- 5.00
Cleveland	5.00- 5.50
Detroit	4.50- 5.00
Eastern Pa.	6.50
New York, dealers	2.00- 2.50
Pittsburgh	7.50- 8.00
St. Louis	4.00- 4.50
Valleys	7.50- 8.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	3.25- 3.50
Buffalo	6.00- 6.50
Cincinnati, dealers	4.50- 5.00
Cleveland	5.50- 6.00
Detroit	5.50- 6.00
Eastern Pa.	5.00- 5.50
New York, dealers	1.50- 1.75
Pittsburgh	7.25- 7.75

CAST IRON BORINGS

Birmingham, plain	4.50- 5.00
Boston, chemical	8.50- 9.00
Boston, dealers	3.25- 3.50
Buffalo	6.00- 6.50
Chicago	5.50- 6.00
Cincinnati, dealers	4.50- 5.00
Cleveland	6.00- 6.50
Detroit	5.50- 6.00
E. Pa., chemical	12.00-15.00
New York, dealers	1.50- 1.75
Pittsburgh	7.25- 7.75
St. Louis	4.00- 4.25

PIPE AND FLUES

Cincinnati, dealers	4.75- 5.25

RAILROAD GRATE BARS

Buffalo	6.50- 7.00
Chicago, net	6.75- 7.25
Cincinnati	4.50- 5.00
Eastern Pa.	8.50
New York, dealers	5.00- 5.50
St. Louis	4.00- 4.50

FORGE FLASHINGS

Boston, dealers	3.75- 4.25
Buffalo	9.50-10.00
Cleveland	8.00- 8.50
Detroit	6.50- 7.00

FORGE SCRAP

Boston, dealers	4.00- 4.50
Chicago, heavy	11.00-11.50
Eastern Pa.	9.50-10.00

ARCH BARS, TRANSOMS

St. Louis	10.00-10.50

AXLE TURNINGS

Boston, dealers	4.50- 5.00
Buffalo	9.00- 9.50
Chicago, elec. fur.	8.50- 9.00
Cleveland	6.00- 6.50
Eastern Pa.	10.00-10.50
St. Louis	6.00- 6.25

STEEL CAR AXLES

Birmingham	10.00-10.50
Boston, ship, point.	9.00- 9.50
Buffalo	13.00 13.50
Chicago, net	10.75-11.25
Eastern Pa.	14.00-15.00
St. Louis	10.00-10.50

SHAFTING

Boston, ship point.	10.50-10.75
Eastern Pa.	15.00-15.50
New York, dealers	10.75-11.25
St. Louis	11.00-11.50

CAR WHEELS

Birmingham, iron	8.50- 9.00
Boston, iron deal.	5.75- 6.00
Buffalo, iron	12.25-12.75
Buffalo, steel	13.00-13.50
Chicago, iron	10.00-10.50
Chicago, rolled steel	10.50-11.00
Cincinnati, iron	8.00- 8.50
Eastern Pa., iron	11.50-12.00
Eastern Pa., steel	13.50-14.00
Pittsburgh, iron	11.25-11.75
Pittsburgh, steel	13.75-14.25
St. Louis, iron	7.50- 8.00
St. Louis, steel	8.00- 8.50

NO. 1 CAST SCRAP

Birmingham	9.00-10.00
Boston, No. 2	7.50
Boston, tex. con.	10 50-11.00
Buffalo, cupola	9.50-10.00
Buffalo, mach.	11.50-12.00
Chicago, agri. net	7.50- 8.00
Chicago, mach. net	8.50- 9.00
Chi., railroad net	8.00- 8.50
Cinci., mach. cup	9.50-10.00
Cleveland, cupola	11.75-12.25
Detroit, net	8.50- 9.00
Eastern Pa., cupola	11.50-12.00
Pittsburgh, cupola	13.00-13.50
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	7.00- 7.50
St. L., No. 1 mach.	8.50- 9.00

HEAVY CAST

Boston, del.	5.50- 5.75
Buffalo, break.	8.00- 8.50
Cleveland, break.	7.50- 8.00
Detroit, break.	6.50- 7.00
Detroit, auto net	9.00- 9.50
Eastern Pa.	10.50
N. Y., No. 1, deal.	6.50- 6.75
N. Y., break. deal.	6.50- 6.75
Pittsburgh	10.00-10.50

MALLEABLE

Boston, consum.	11.50-12.00
Buffalo	12.00-12.50
Chicago, R. R.	10.50-11.00
Cincinnati, agri. del.	8.00- 8.50
Cinci., R. R. del.	9.00- 9.50
Cleveland, rail	11.50-12.00
Detroit, auto	8.50- 9.00
St. Louis, R. R.	8.25- 8.75
Eastern Pa., R. R.	11.50-12.00

RAILS FOR ROLLING

5 feet and over

Birmingham	10.00-11.00
Boston, dealers	7.00- 7.25
Buffalo	12.00-12.50
Chicago	11.00-11.50
Eastern Pa.	12.00-13.00
New York, dealer	7.50- 8.00
St. Louis	9.00- 9.50

LOCOMOTIVE TIRES

Chicago (cut)	11.00-11.50
St. Louis, No. 1	9.50- 10.00

LOW PHOS. PUNCHINGS

Buffalo	13.75-14.25
Chicago	11.00-11.50
Eastern Pa.	14.50-15.00
Pittsburgh	13.50-14.00

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper: Electro., del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead: New York	Lead: East St. L.	Zinc: St. L.	Aluminum 98-99%	Antimony Spot, N. Y.	Ingot Nickel
June 30	9.00	9.12½	8.75	51.12½	51.17½	3.75	3.60	4.30	*22.90	7.75	36.00
July 2	9.00	9.12½	8.75	51.30	51.37½	3.75	3.60	4.35	*22.90	7.75	36.00
July 3	9.00	9.12½	8.75	51.30	51.37½	3.75	3.60	4.35	*22.90	7.75	36.00
July 4—Holiday											
July 5	9.00	9.12½	8.75	52.00	52.07½	3.75	3.60	4.35	*22.90	7.75	36.00
July 6	9.00	9.12½	8.75	51.95	52.02½	3.75	3.60	4.35	*22.90	7.75	36.00

*Nominal range 18.00c to 22.90c.

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore*	3.00c
Boston††	2.95c
Buffalo	2.95c
Chattanooga	3.41c
Chicago	2.95c
Cincinnati	3.15c
Cleveland	2.95c
Detroit	3.13½c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.40c
New York‡(d)	3.22c
Pittsburgh(h)	2.80c
Philadelphia*	2.90c
San Francisco	3.60c
Seattle	3.60c
St. Louis	3.29c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS

Portland	3.40c
Chattanooga	3.41c
Baltimore*	3.00c
Chicago	2.75c
Cincinnati	3.15c
New York‡(d)	3.32c
Philadelphia*	2.90c
St. Louis	3.29c
Tulsa	3.25c

REINFORC. BARS

Buffalo	1.95c
Chattanooga	3.41c
Chicago	2.10c-2.60c
Cleveland (c)	1.97½c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.15c
New Orleans	3.50c
Pitts., plain(h)	3.15c
Pitts., twisted squares (h)	3.27½c
San Francisco	2.45c
Seattle	3.50c
St. Louis	3.44c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore*	3.00c
Boston††	3.17c
Buffalo	3.20c
Chattanooga	3.61c
Chicago	3.20c
Cincinnati	3.40c
Cleveland	3.31c
Detroit	3.45c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.60c
New York(d)	3.37c
Philadelphia*	2.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.49c
St. Paul	3.25c
Tulsa	3.50c

PLATES

Baltimore*	3.00c
Boston††	3.18c
Buffalo	3.20c
Chattanooga	3.61c
Chicago	3.20c
Cincinnati	3.40c
Cleveland, ¼-in. and over	3.31c
Detroit	3.30c
Detroit, ⅜-in.	3.65c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.60c
New York(d)	3.40c
Philadelphia*	2.95c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.49c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE

Baltimore*	3.20c
Boston††	3.25c
Buffalo	3.10c
Chattanooga	3.51c
Chicago	3.05c
Cincinnati	3.20c
Cleveland	3.11c
Det., 8-10 ga.	3.28½c
Houston	3.35c
Los Angeles	3.80c
New Orleans	3.70c
New York	3.27c
Portland	3.75c
Philadelphia*	3.05c
Pittsburgh(h)	3.05c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.44c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK

Baltimore*†	3.76c
Boston (g)	3.95c
Buffalo	3.25c
Chattanooga	4.41c
Chicago	3.90c
Cincinnati	4.05c
Cleveland	3.96c
Detroit	4.185c
Los Angeles	4.35c
New York	4.05c
Philadelphia*†	3.60c
Pittsburgh**	3.60c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.34c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS

Baltimore*†	4.36c
Buffalo	4.00c
Boston (g)	4.55c
Chattanooga	5.01c
Chicago (h)	4.55c
Cincinnati	4.70c
Cleveland	4.61c
Detroit	4.85c
Houston	4.40c
Los Angeles	5.05c
New Orleans	4.95c
New York	4.25c
Philadelphia*†	4.25c
Pitts.** (h)	4.15c-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.94c
St. Paul	4.19c
Tulsa	5.10c

BANDS

Baltimore*	3.30c
Boston††	3.25c
Buffalo	3.30c
Chattanooga	3.76c
Chicago	3.30c
Cincinnati	3.45c
Cleveland	3.36c
Detroit, ⅜-in. and lighter	3.53½c
Houston	3.25c
Los Angeles	3.90c
New Orleans	3.95c
New York(d)	3.62c
Philadelphia	3.15c
Pittsburgh(h)	3.70c
Portland	3.90c
San Francisco	4.05c
Seattle	3.90c
St. Louis	3.69c
St. Paul	3.20c
Tulsa	3.45c

HOOPS

Baltimore	2.80c
Boston	4.25c
Buffalo	3.55c
Chicago	3.30c
Cincinnati	3.45c
Det., No. 14 and lighter	3.53½c
New York	3.62c
Philadelphia	3.40c
Pittsburgh(h)	3.70c
Seattle	5.60c
St. Paul	3.75c

COLD FIN. STEEL

Baltimore(c)	3.71c
Boston	4.00c-4.50c
Buffalo (h)	3.55c
Chattanooga*	4.06c
Chicago (h)	3.50c
Cincinnati	3.70c
Cleveland(h)	3.50c
Detroit	3.63½c
Los Ang.(f)(d)	4.95c
New Orleans	4.30c
New York	3.92c-4.42c
Philadelphia	3.73c
Pittsburgh(h)	3.45c
Portland (f)	4.75c
San Fran.(f)(d)	5.95c
Seattle(f)(d)	4.75c
St. Paul	3.20c
St. Louis	3.74c
Tulsa	4.65c

COLD ROLL. STRIP

Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	5.25c
Chicago (b)	3.45c
Cincinnati(b)	3.42c
Cleveland (b)	3.20c
Detroit	3.33c
Philadelphia	4.00c
New York	4.70c
St. Louis	5.74c

(b) Plus straightening, cutting and quantoty differentials.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
(e) New mill classif.
(f) Rounds only.
(g) 50 bundles or over.
(h) Outside delivery, 10c less.

‡Domestic bars.
*Plus quan. extras.
**Under 25 bundles.
*†50 or more bundles.
†New extras apply.
††Base 40,000 lbs. extras on less.

Prices at Detroit, Cleveland, Chicago, Pittsburgh, Cincinnati, Chattanooga, New York, Boston, St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 9999 pounds, base; 10,000 to 19,999 pounds, 15 cents under; 20,000 to 39,999 pounds, 25 cents under; 40,000 pounds and over, 35 cents under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, July 5

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports £ s d		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665 £ s d	£ s d
PIG IRON				
Foundry, 2.50-3.00 Silicon.	$15.18	3 0 0	$7.55	1 11 0
Basic bessemer	13.66	2 14 0*	7.30	1 10 0
Hematite, Phos. .03-.05	15.31	3 0 6	....	.....
SEMIFINISHED STEEL				
Billets	$27.83	5 10 0	$11.44	2 7 0
Wire rods, No. 5 gage	39.47	7 16 0	21.90	4 10 0
FINISHED STEEL				
Standard rails	$39.22	7 15 0	$26.77	5 10 0
Merchant bars	1.70c	7 10 0	.69c to .72c	3 2 6 to 3 5 0
Structural shapes	1.67c	7 7 6	.68c	3 1 6
Plates, †¼ in. or 5 mm.	1.81c	8 0 0	.91c	4 2 6
Sheets, black, 24 gage or 0.5 mm.	2.09c	9 5 0	1.13c to 1.16c	5 2 6 to 5 5 0
Sheets, gal., 24 gage, corr.	2.54c	11 5 0	1.43c	6 10 0
Bands and strips	1.86c	8 5 0	.88c	4 0 0
Plain wire, base	2.09c	9 5 0	1.18c	5 7 6
Galvanized wire, base	2.37c	10 10 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base	2.71c	12 0 0	1.27c	5 15 0
Tin plate, box 108 lbs.	$4.36	0 17 3	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d 4($3.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$17.08	3 7 6(a)	$13.20	200	$14.51	310	$24.16	63
Basic bessemer pig iron	16.45	3 5 0*	12.21	185	13.57	290	26.65 (b)	69.50
Furnace coke	4.43	0 17 6	7.92	120	5.15	110	7.29	19
Billets	27.83	5 10 0	28.38	430	20.59	440	37.01	96.50
Standard rails	1.86c	8 5 0	2.10c	700	2.31c	1100	2.30c	132
Merchant bars	1.94c	8 12 0	1.50c	500	1.16c	550	1.91c	110
Structural shapes	1.98c	8 15 0	1.65c	550	1.16c	550	1.87c	107.50
Plates, †¼-in. or 5 mm.	1.92c	8 10 0	2.10c	700	1.47c	700	2.21c	127
Sheets, black	2.37c	10 10 0§	2.55c	850‡	1.63c	775‡	2.51c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.94c	13 0 0	4.50c	1,500	3.15c	1,500	6.44c	370
Plain wire	2.09c	9 5 0	3.39c	1,130	2.31c	1,100	3.01c	173
Bands and strips	2.11c	9 7 0	1.95c	650	1.47c	700	2.21c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. (a) del. Middlesbrough. (b) hematite

Bars

Bar Prices, Page 54

Pittsburgh—A reduction in the alloy bar market to 2.45c, Pittsburgh, was announced last week shortly after the reduction in merchant carbon steel bars at $2 a ton to 1.80c base, Pittsburgh. Alloy steel bars will therefore be quoted 2.45c beginning July 13, at Pittsburgh, Buffalo, Chicago, Bethlehem, Pa., and Massillon-Canton, O. bases. The reductions have not stimulated buying. Merchant rail steel bars have been reduced $2 a ton to 1.70c, Pittsburgh.

Cleveland—Carbon steel bars now are 1.85c, base, Cleveland, an advance of $1 a ton over the price at which most orders were booked in second quarter, but $2 a ton less than the price recently named for third quarter. The "reduction" has not led to many sales so far. Some consumers say they would have preferred to see the original $3 a ton advance hold. A few who stocked up in anticipation of it state they would not have ordered so much material if they knew the increase was to be only $1, their interest charges more than offsetting their gain. Alloy steel bars have been reduced $2 a ton to 2.45c, base, Chicago.

In new prices filed with the American Iron and Steel instituted and just released, cold-finished alloy bars are established at 2.95c, Chicago, Cleveland and Gary, effective July 13.

Chicago—Reduction of $2 a ton in soft steel bars has been followed by similar revisions in iron and rail steel material, with alloy bars off $1 a ton, effective July 12. New business and specifications were light the past week and shipments also were retarded. Some increase in deliveries is anticipated following the effective dates of recent price revisions, although the movement will show a sharp decrease from the active June rate.

Boston—Demand for commercial steel, alloy and forging bars is light. Before the reduction to 1.80c, Pittsburgh, bar consumers had done practically no buying. Most consumers bought somewhat more heavily in second quarter, but stocks are not unusually large. Bars delivered at Boston are now 2.20c.

Philadelphia—Commercial steel bar buying, which has been at a low ebb, is expected to show some improvement this week. Recent reductions and some uncertainty as to their application to alloy bars has held up some volume which is expected to be released moderately during the remainder of the month.

Plates

Plate Prices, Page 54

Pittsburgh—Fort Pitt Brewing Co. last week awarded tank work for its new Sharpsburg, Pa., brewery, taking a total of 350 tons. Blaw-Knox Co., Blawnox, Pa., will build the cylindrical tanks and the order for the rectangular tanks, taking 200 tons, was divided between Treadwell Construction Co., Midland, Pa., and McClintic-Marshall Corp., Bethlehem, Pa. American Bridge Co., Pittsburgh, is completing work this week on repairs to the last of 50 barges for Carnegie Steel Co. A few minor sales of plates were made last week at 1.85c base, Pittsburgh, where shipment was requested immediately but effective July 10 plates are reduced $1 a ton to 1.80c, Pittsburgh.

Cleveland—All sellers now are quoting the new price of 1.80c, base, Pittsburgh, or 1.98½c, delivered, Cleveland, on steel plates, these representing a net increase of $2 a ton over the price at which most tonnage was booked in second quarter. Prices of floor plates have not been affected by the reduction in the advances originally announced for third quarter. Railroad requirements for the present appear to be the best outlet for plates; Wheeling & Lake Erie has distributed approximately 1200 tons of plates, shapes and bars to several sellers. Miscellaneous demand is quiet.

Chicago — Awards of fabricated plate products are light although a fairly large tonnage is involved in pending work. Placing of municipal water tanks is slow, with some additional units included in projects for which new PWA funds have been appropriated. Plates will be 1.85c, Chicago or Gary, on July 10, bringing them to a parity with bars.

Boston—Some improvement is expected within the next ten days. There has been little full coverage for the next quarter. The $1 a ton reduction brings the price to 2.20c, Boston.

New York—Plate buying is light and confined largely to specialties. Effective July 12 plates will be quoted 2.13c, delivered, New York.

Philadelphia—Confusion as to new prices and the holiday brought plate business practically to a standstill, but some buying is expected the latter part of this week at the $1 a ton reduction.

Contracts Placed

350 tons, brewing tanks for Fort Pitt Brewing Co., Sharpsburg, Pa.; cylindrical tanks, 150 tons, to Blaw-Knox Co., Blawnox, Pa., and rectangular tanks, 200 tons, divided between Treadwell Construction Co., Midland, Pa., and McClintic-Marshall Corp., Bethlehem, Pa.

335 tons, 16 tanks, Standard Oil Co. of New Jersey, Oceanside, N. Y., to Chicago Bridge & Iron Works, Chicago.

175 tons, four 55,000-barrel tank roofs, Pan American Petroleum & Transportation Co., Destrehan, La., to Chicago Bridge & Iron Works, Chicago.

100 tons, water tank and tower, veterans' hospital, Canadaigua, N. Y., to Chicago Bridge & Iron Works, Chicago.

Unstated tonnage, 500,000-gallon elevated water tank, Two Rivers, Wis., to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

Contracts Pending

1870 tons, 54 to 63-inch welded pipe, Green River pipe line, Tacoma, Wash; bids July 10.

1025 tons, gates for Parker dam, Arizona; bids July 26.

900 tons, Sunset pipe line, San Francisco; bids July 6.

175 tons, M. street bridge, Sacramento river, Sacramento, Calif.; George Pollock Co., Sacramento, Calif., low on general contract.

150 tons, 28-inch welded pipe, dam, Fort Peck, Montana; bids July 16.

Unstated, reclamation project siphon, 4½ miles in length; bids probably in August; R. F. Walters, chief engineer, Ontario, Oreg.

Sheets

Sheet Prices, Page 54

Pittsburgh—Reductions in sheet prices continued through all of last week so that by the close of the week the entire market had dropped from $1 to $4 a ton. These grades are down $1 a ton: Cold-rolled No. 10, mill run cold-rolled No. 10, and hot-rolled pickled in the breakdown No. 10 gage. Reductions of $2 were made in tin mill black and enameling sheets; $3 a ton on hot-rolled No. 10 base and galvanized sheets, and $4 a ton on hot-rolled No. 24 gage and cold-rolled No. 20 gage.

Cleveland—Sheet mills suspended operations last week, and shipments practically stoppd because material could not be moved at the new reduced prices until their effective date, July 7. Mills will resume this week, and the general average in this district will be around 30 per cent. The chief reaction on the parts of those buyers who did not stock heavily and who were expected in the market shortly has been to indicate deferment of commitments on the assumption that prices may be fur-

ther reduced. Consumption by the automobile industry, refrigerator and stove manufacturers is holding up fairly well.

Chicago—Sheet mill operations are at a low ebb and deliveries are expected to continue light for several weeks. Introduction of lower prices on July 7, 10 and 12 will result in reductions of $1 to $4 a ton. Consumption is fairly well maintained.

Boston—Without a test on the sheet prices originally filed for third quarter, reductions effective July 7, came as a surprise to most consumers. In numerous instances buyers took in heavy tonnage during the second quarter and little buying activity is expected for several weeks.

New York—Galvanized sheets, long ternes, tin mill black, porcelain enameled sheets and pickled in the break down sheets are among the more important grades to have been added to the list of flat rolled products for price reduction. Galvanized sheets, effective July 10 are down $3 a ton to 3.10c, Pittsburgh; long ternes $4 to 3.45c, Pittsburgh, effective July 9; tin mill black, $2 to 2.75c, Pittsburgh, and porcelain sheets $2 to 3.10c, Pittsburgh, with similar reductions on the latter at Gary, Ind., and Pacific coast ports. Demand is light.

Philadelphia—Sheet demand is light, although some automobile business was placed last week. Railroads and the larger consumers are placing little tonnage.

Cincinnati—Sheet producers in this district are adjusting prices downward to conform with new schedules of mills in other districts. Production was cut sharply over the holiday period, some mills being shut down for the week to take inventory and make repairs.

Railroads

Track Material Prices, Page 55

With freight car orders for first half of 1934 totaling 23,259, the largest number for a first half since 1930 when 32,604 cars were placed, informal inquiries indicate the possibility of 6000 to 8000 additional cars being purchased later in the year. A number of western roads have asked figures on carbuilding, it is believed for the purpose of providing appropriations.

Board of transportation, New York, will open bids July 20 on 6070 gross tons of standard rails, 381 tons of guard rail, 425 tons of miscellaneous spikes, 100,000 pieces bolts, and about 200,000 tie plates. About 700 tons of rails and 200 tons of tie plates are pending for export.

Production of steel rails continues to taper, Chicago mills will be engaged steadily at about 40 per cent through July and August, but the Pittsburgh district will complete rollings late in July.

Some buying of track accessories is being done in small lots. Wheeling & Lake Erie has distributed about 1200 tons of plates, shapes and bars for third quarter to several producers.

No change has been made in prices at all basing points of 2.40c on railroad spikes, 1.90c on tie plates, 2.55c on angle bars, and 3.55c on track bolts, and no reduction is expected since these products were not advanced in April with other steel markets.

Carnegie Steel Co., Pittsburgh, has awarded repairs to 13 hoppers to the Greenville Steel Car Co., Greenville, Pa.

Domestic freight car orders in June totaled 1835, compared with 717 in May. The six months total of 23,259 compares with 566 for the same period in 1933. Principal orders for cars in June were 1000 box cars for the Seaboard Air Line and 820 cars the Baltimore & Ohio will build in its own shops. Further details follow:

	1934	1933	1932	1931
Jan.	152	3	159	100
Feb.	19,725	0	35	50
March	30	5	105	2,166
April	800	50	0	2,798
May	717	8	60	20
June	1,835	500	0	1,910
6 mo.	23,259	566	359	7,045
July	.....	306	25	617
Aug.	.....	202	5	1,304
Sept.	.....	23	1,298	703
Oct.	.....	514	0	980
Nov.	.....	533	2	35
Dec.	.....	316	50	11
Total	.....	2,460	1,739	10,694

Car Orders Placed

Detroit, Toledo & Ironton, 15 steel covered hopper cars, 55 tons capacity, for carrying bulk cement, to Greenville Steel Car Co., Greenville, Pa.

Locomotives Placed

Aliquippa & Southern, one switch engine, to American Locomotive Co., Schenectady, N. Y.

Rail Orders Placed

Panama Canal Office, Washington, 1450 tons, divided equally between Bethlehem Steel Co., Bethlehem, Pa., and United States Steel Products Co., New York, the latter also taking the fastenings.

Rail Orders Pending

Board of transportation, New York, 6070 tons standard rails; 381 tons guard rails; 425 tons spikes; 100,000 bolts; 200,000 tie plates; bids July 20.

Pipe

Pipe Prices, Page 55

Pittsburgh—Pipe discounts are quoted unchanged despite recent general reduction in steel prices. Current activity in pipe mills at Pittsburgh, which are running this week at probably 20 to 25 per cent of capacity, is in producing mill stocks. Mill warehouse inventories in the South, Southwest and Pacific coast have run down as much as 50, 60 and 70 per cent of tonnage and sizes ordinarily carried.

Cleveland—Elyria, O., has obtained a government loan of $408,000, as part of the cost of a 36-inch water main, which will require approximately 6000 tons of cast pipe. The market for steel pipe is quiet.

Chicago—A large number of 61 new PWA projects in Illinois for which $13,000,000 has been appropriated will involve cast pipe. Bids are expected to be asked for this work in the near future. Orders are slow to be placed for work on which bids previously had been taken, as well as in the release of orders already placed.

New York—Cast pipe buying is light. Close to 1500 tons for Gloversville, N. Y., is still pending and bids went in July 6 on close to 400 tons for Wells, N. Y. Prices, since the recent increase, are holding better. Steel pipeline tonnage is negligible, although various sixable jobs are being held up pending details of financing.

Cast Pipe Placed

9300 tons, 6 to 16-inch, class 150, San Francisco, allocated as follows: 5700 tons to United States Pipe & Foundry Co., Burlington, N. J.; 2100 tons to National Cast Iron Pipe Co., Birmingham, Ala., and 1500 tons to American Cast Iron Pipe Co., Birmingham.

700 tons, 6 and 12-inch, Madison, Wis., to Central Foundry Co., New York.

256 tons, 6-inch, class 150, Whittier, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

200 tons, Fort Peck dam, Montana, to unnamed interest.

160 tons, 4 and 6-inch, class 150, South Pasadena, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

103 tons, 3 to 24-inch pipe fittings, Chicago, to Rudisil Soil Pipe Co., Appleton, Ala.

Cast Pipe Pending

6000 tons, water main for Elyria, O.; federal loan approved.

750 tons, Stowe, Vt.; bids July 12.

420 tons, 6 and 8-inch, Bethel, N. H.; R. D. Wood & Co., Philadelphia, low.

400 tons, various sizes, Goshen, Ind.; general contractors' bids closed.

200 tons, 4, 6 and 8-inch, also accessories, Tonasket, Wash.; bids July 9.
148 tons, 4 and 6-inch, class 150, Santa Monica, Calif.; bids opened.
Unstated tonnage, 21,400 feet, 6 to 12-inch, also 1800 feet, 1 to 2-inch, galvanized pipe, 75,000-gallon elevated steel tank, 15,000-gallon wash tank, fittings, gate valves, hydrants, manholes and connections, waterworks and sewer improvement, PWA project, Williamston, S. C.; bids July 17, H. V. G. Cooley, mayor; Harwood Beebe Co., Spartansburg, S. C., engineer.
Unstated tonnage, 44,600 feet, 2 to 18-inch, also valves and fittings, 75,000-gallon steel tank and 125-foot tower, waterworks system, Clarence, Mo.; bids July 12, W. H. Hudson, mayor; J. W. Shikles & Co., Kansas City, Mo., consulting engineers.
Unstated tonnage, fittings, Chicago; bids July 13.

Steel Pipe Pending

1600 tons, approximately, 18,940 feet of 52 to 63-inch, water system extension, Tacoma, Wash.; bids soon, alternates on concrete pipe.

Strip Steel

Strip Prices, Page 55

Pittsburgh—A reduction of $4 a ton in cold-rolled strip steel to 2.60c base, Pittsburgh, followed closely upon the announcement ten days ago that hot-rolled strip was to be available at 1.85c base, Pittsburgh, the latter being a cut of $3 a ton. Strip buyers who anticipated needs before second quarter closed say they will be at a loss, as a saving of $1 a ton, and not $3 or $4 a ton, will hardly justify carrying expenses.

Cleveland—Cold-rolled strip now is generally quoted 2.60c, base, Cleveland, $4 a ton less than the price filed in April for the remainder of second quarter and third quarter. The new price, however, still is $4 a ton higher than that at which most material was shipped in May and June. The reduction so far has failed to stimulate inquiry, and sales are light.

Chicago—New business in strip is light and business is expected to be retarded until consumers have an opportunity to absorb some of the excess material accumulated last quarter. The reduction of $3 a ton in hot strip to 1.95c, Chicago, became effective July 7. Cold-rolled strip is quoted $2.60, Pittsburgh-Cleveland, a reduction of $4 a ton, effective July 10. Consumption in the automotive industry is fairly steady but some decrease is noted in requirements of other users.

Boston—Practically no business was done on cold-rolled strip at 3.00c, Worcester, Mass., before a price reduction was filed at 2.80c, Worcester, effective this week. Finishing mill operations are off and little buying is expected for several weeks.

New York—Strip sellers generally have made a reduction in cold-rolled strip of $4, to 2.60c, Pittsburgh, following a $3 reduction in hot strip to 1.85c, Pittsburgh and 1.95c, Chicago. The lower prices have stimulated little trading here.

Ferroalloys

Ferroalloy Prices, Page 56

Ferromanganese specifications reflect the decline in steelmaking operations. The market is $85, duty paid, Atlantic and Gulf ports. Domestic spiegeleisen continues unchanged at $26, furnace, for quantities up to 50 tons, and $24 for 50 tons and over.

SIMPLIFYING FABRICATION with EXTRA WIDE FLATS

They are winning new friends every day among steel users who are alert to manufacturing economies.

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If you are looking for cost-cutting opportunities, think of B & L Extra Wide Flats in terms of your own problems: such as backing-plates for dies, pattern plates, stripper plates, bed plates, jigs, fixtures and equipment parts.

They not only simplify fabrication but also give greater precision in production. They are cold drawn to uniform straightness and flatness with size tolerance of plus .000″ to minus .008″—sawed to length, not sheared. Available in standard widths of 8, 10 and 12″ with thickness of ¼″ to 2″—intermediate widths supplied on order.

B & L Extra Wide Flats may hold profitable possibilities for you. Let us show you how these convenient sections may be applied to your products.

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Shapes

Structural Shape Prices, Page 54

Cleveland—Award of 1400 tons of shapes for a strip mill building for the Ford Motor Co., River Rouge, Mich., to Fort Pitt Bridge Works, Pittsburgh, features the market. For a government breakwall at Fairport Harbor, O., 900 tons of sheet piling has been distributed. The general contract for a breakwall at Ashtabula, O., also has been placed, and 200 tons of sheet piling will be purchased shortly. A few small lots are required for state bridges on which bids are being taken by the highway commission, Columbus, July 13 and 14. Plain shapes now are 1.98½c, delivered, Cleveland.

Pittsburgh—A $1 a ton reduction in structural shapes now places the market at 1.80c, Pittsburgh. No change has been made in piling, remaining 2.15c, Pittsburgh. Inquiry for structural shapes is slow. Pennsylvania highway lettings for July 13 include an 846-ton bridge.

Chicago—Structural awards and inquiries are the smallest in several weeks. Large tonnages are involved in several public projects, including western dams and the Mississippi river bridge at Bettendorf, Iowa. The 16,150 tons of piling for the Fort Peck, Mont., dam is reported to be the largest tonnage ever involved in permanent piling construction. Bids will be opened on this work July 9.

Buffalo—There is a good demand for medium size and small lots of structural steel. Current inquiry in this district totals more than 3000 tons.

Boston—Structural steel awards are small, but include close to 350 tons for bridges in Maine and New Hampshire. Most of the pending tonnage is for public work, including additional state hospital buildings. Shapes delivered at Boston now are 2.18½c.

New York—Structural steel outlook is brighter with heavier inquiry, including several projects taking close to 1000 tons each. Specifications are expected out on one section of the New York Central west-side Manhattan project this month with a second section next month, taking 25,000 tons in both sections.

Philadelphia—Structural awards and inquiries are light. A reduction of $1 a ton on plain material makes the price 2.00½c, Philadelphia.

Shape Contracts Placed

1800 tons, armory, Jersey City, N. J., to Oltmer Iron Works, Jersey City.

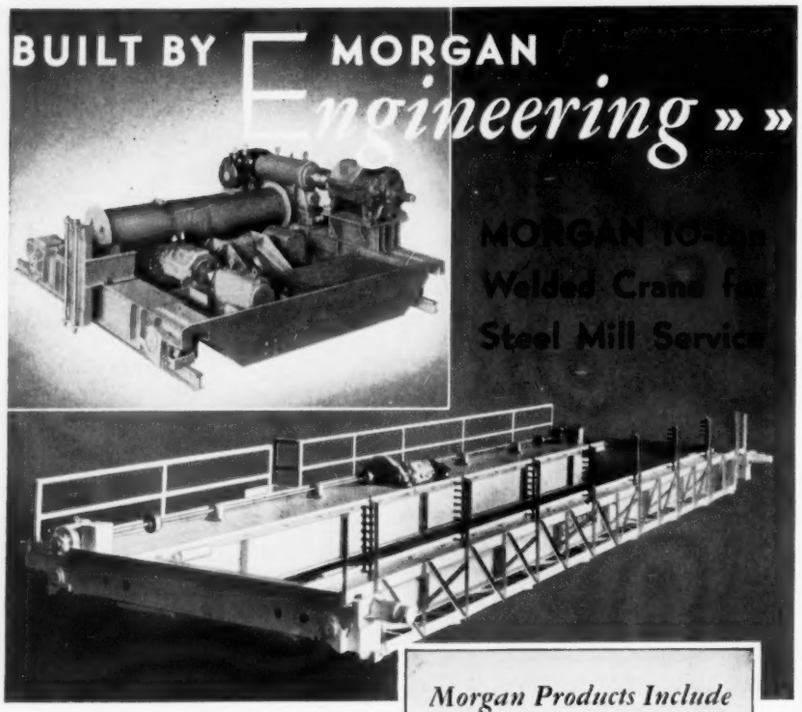
1400 tons, strip mill building for Ford Motor Co., River Rouge, Mich., to Fort Pitt Bridge Works, Pittsburgh.

1130 tons, building, Distillers Co. Ltd., Linden, N. J., to McClintic-Marshall Corp., Bethlehem, Pa.; Turner Construction Co., New York, general contractor. (Tonnage previously listed as awarded.)

900 tons, government breakwall at Fairport Harbor, O., distributed to Carnegie Steel Co., Jones & Laughlin Steel Corp., Pittsburgh, and Bethle-

Shape Awards Compared

	Tons
Week ended July 7	12,430
Week ended June 30	17,385
Week ended June 23	23,757
This week in 1933	25,406
Weekly average for 1933	15,413
Weekly average, 1934	17,005
Weekly average, June	18,040
Total to date, 1933	428,276
Total to date, 1934	476,147



GREATER reliance upon the material handling economies effected by modern crane equipment has compelled industry to look deeply into the problem of installing a crane for intermittent service that is as carefully engineered and constructed as those used by steel plants for the past half-century. And since most of the steel plants in this country operate one or more Morgan Heavy Duty Steel Mill Cranes, we regard it as a privilege to submit records of Morgan engineering integrity proved more than merely adequate in such service. Morgan has also built many cranes for power houses, railroads and general industrial service. In the crane illustrated, the Trolley is operated through worm reduction units which greatly simplify the construction and reduce maintenance to a minimum. Trolley frame and bridge end carriages are built up from rolled steel sections and welded.

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•

DESIGNERS
MANUFACTURERS
CONTRACTORS

THE MORGAN ENGINEERING COMPANY

New York, 11 W. 42d St. ALLIANCE, OHIO *Pittsburgh, 1420 Oliver Bldg.*

hem Steel Co., Bethlehem, Pa.

800 tons, Winner road viaduct, Kansas City, Mo., to Kansas City Structural Steel Co., Kansas City.

770 tons, state highway bridge, Janney, Bucks county, Pennsylvania, to McClintic-Marshall Corp., Bethlehem, Pa.

650 tons, Miriam Osborne Home, Rye, N. Y., to Ingalls Iron Works Co., Birmingham, Ala.; through Marc Eidlitz & Son, New York.

500 tons, lime plant, Mathieson Alkali Corp., Lake Charles, La., to Virginia Bridge & Iron Co., Roanoke, Va.

480 tons, viaduct, highway 167, Union county, Arkansas, to Arkansas Foundry Co., Little Rock, Ark.; Fred Luttjohnn, Topeka, Kans., general contractor.

450 tons, bridges for Southern Pacific railroad over Truckee river, California, to Virginia Bridge & Iron Co., Roanoke, Va.

425 tons, bath house, Saratoga, N. Y., to Shipper Carline Inc., Milton, Pa.; through George A. Fuller Co.

340 tons, chemistry building, addition, University of California, Los Angeles, to Pacific Coast Steel Corp., Los Angeles.

265 tons, bridge No. 37-80, Central Railroad of New Jersey, to Fort Pitt Bridge Works, Pittsburgh.

250 tons, state bridge, Arkansas, to Vincennes Bridge Co., Vincennes, Ind.

250 tons, state bridge, Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

250 tons, building, Standard Brands Inc., Peekskill, N. Y., to American Bridge Co., Pittsburgh.

250 tons, warehouse, Staten Island, New York, for Proctor & Gamble Co., Cincinnati, to Pittsburgh Bridge & Iron Works, Rochester, Pa.; W. K. Ferguson Co., Cleveland, general contractor.

240 tons, state bridge, Doverbrook, Pa., to Phoenix Bridge Co., Phoenixville, Pa.

225 tons, building additions, Carborundum Co., Niagara Falls, N. Y., to R. S. McManus Steel Construction Co., Buffalo.

200 tons, deck plate girder spans, E65, for state of Pennsylvania, to American Bridge Co., Pittsburgh.

200 tons, cement plant addition, Ada, Okla., to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.

200 tons, plant addition, Westinghouse Air Brake Co., Wilmerding, Pa., to McClintic-Marshall Corp., Bethlehem, Pa.

200 tons, building for Spring Perch Co., Lackawanna, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.

190 tons, bridge at Sygan, Pa., for Pittsburgh & West Virginia railroad, to American Bridge Co., Pittsburgh.

180 tons, nurses' home and utility buildings, state hospital, Westboro, Mass., to Bethlehem Fabricators Inc., Bethlehem, Pa.; Daniel Cunningham Co., Boston, general contractor.

165 tons, turbine house, Container Corp., Philadelphia, to Belmont Iron Works, Philadelphia.

160 tons, addition, Buffalo Electro-Chemical Co., Buffalo, to Buffalo Structural Steel Co., Buffalo.

160 tons, beam sections for United States engineer, Cincinnati, to McClintic-Marshall Corp., Bethlehem, Pa.

Shape Contracts Pending

8000 tons, three pier sheds, docks 88, 90 and 92, Hudson river, New York; George F. Driscoll Co., Brooklyn, N. Y., low on two sheds, and William Kennedy Co., low on the third. Bids will be taken in about a week on a fourth shed, requiring 3500 tons.

2213 tons, M street bridge over Sacramento river, Sacramento, Calif.; George Pollock Co., Sacramento, low for general contract.

1200 tons, Kensington high school, Buffalo; bids in August.

1100 tons, Jerome avenue viaduct, Bronx, N. Y.

1000 tons, high school, Jamestown, N. Y.

1000 tons, inspection shed and service building, for New York city.

825 tons, apartments, Prudential Life Insurance Co., Newark, N. J.

750 tons, auditorium, San Jose, Calif.; bids opened but exceeded estimate and new bids to be taken.

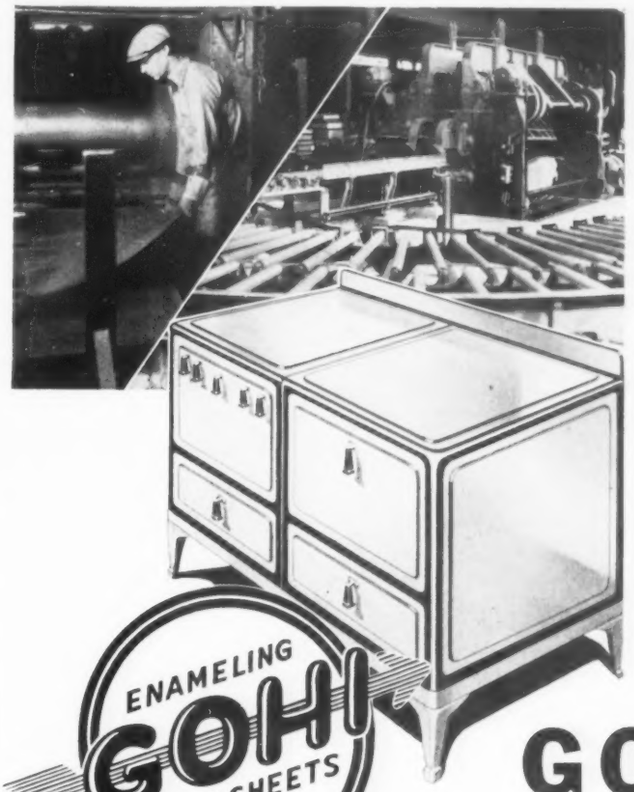
600 tons, high school, Lake Forest, Ill.

540 tons, state highway bridge, Golden Ring, Md.; bids in.

400 tons, junior high school, Reading Pa.

425 tons, state bridge, Littleton, N. H.

360 tons, state bridge over Tippecanoe



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river, Monticello, Ind.; bids July 10.
358 tons, state bridges, Pulaski and Douglas counties, Missouri.
350 tons, east wing, city hall, Columbus, O.
352 tons, bridge, Big Timber creek, Camden-Gloucester counties, New Jersey; bids July 23.
320 tons, school, Wolcott, N. Y.; bids in.
250 tons, warehouse, United States Gypsum Co., Greenville, Miss.
250 tons, state bridge, Shawnee, Okla.
230 tons, state highway bridge, Jordan, Minn.
225 tons, Fourteenth street overhead, Sheboygan, Wis.; bids July 11.
200 tons, state bridge, Macon, Miss.
200 tons, plant addition for Rome Brass & Copper Co., Rome, N. Y.
175 tons, building for University of Montana, Missoula, Mont.
125 tons, addition to Sattler store, Buffalo; bids in.

Reinforcing

Reinforcing Bar Prices, Page 55

Pittsburgh — Base price at Pittsburgh on reinforcing steel bars remain unchanged with the market quoted 2.05c for cut lengths in the open market, or 1.85c, Pittsburgh, to jobbers. Mill lengths of reinforcing bars are available at an unchanged 1.95c base, with rail steel bars 1.90c. PWA funds totaling $24,500,000 were granted last week for work in Allegheny county (Pittsburgh) and it is estimated that five new bridges and other buidling projects will require in aggregate some 5000 tons of reinforcing bars and mesh.

Cleveland—Reinforcing bar prices have not yet shared in the general steel price reduction for third quarter. Eleven projects advertised by the state highway commission, Columbus, for July 13 and 14, take a total of 90 tons of concrete bars. Private work also has failed to improve.

Chicago — Reinforcing bar orders recently have been the heaviest in several months, headed by 807 tons for section 9 of the Chicago sanitary district. Illinois has distributed orders for several hundred tons for road work, while a few small lots for other public projects also have been closed.

Boston—For the Bellamy river bridge, Dover, N. H., 350 tons remains to be placed, while several hundred tons for hospital and other public buildings are up for figures.

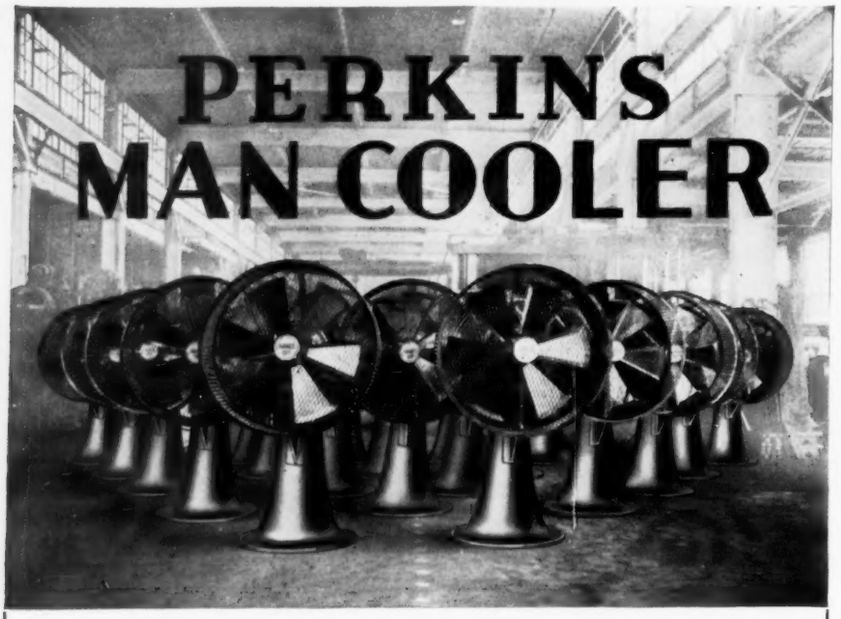
New York—New inquiry for reinforcing steel bars is light. Contractors with specific projects are slow to close on requirements. Highways and bridges account for the greater volume of pending tonnage.

Reinforcing Steel Awards

807 tons, section 9, Chicago sanitary district, to Concrete Engineering Co., Chicago; Paschen Bros. Inc., Chicago, general contractor.
300 tons, road work, Illinois; 200 tons to Concrete Engineering Co., and 100 tons to Concrete Steel Co., Chicago.
200 tons, chemistry building addition, University of California, Los Angeles, to unnamed interest.
187 tons, viaduct, highway 167, Union county, Arkansas, to Arkansas Foundry Co., Little Rock, Ark.; Fred Lutt-

Concrete Awards Compared

	Tons
Week ended July 7	2,422
Week ended June 30	2,025
Week ended June 23	2,485
This week in 1933	5,832
Weekly average for 1933	3,771
Weekly average, 1934	4,694
Weekly average, June	4,816
Total to date, 1933	89,182
Total to date, 1934	131,453



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ENGINEERS AND MANUFACTURERS
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john, Topeka, Kans., general contractor.

150 tons, school, Palm avenue, Huntington Beach, Calif., to unnamed interest.

127 tons, bridge, Port Colden, Warren county, New Jersey, to Joseph T. Ryerson & Son Inc.; through Franklin Contracting Co.

126 tons, dye house addition, Pepperill Mfg. Co., Lindale, S. C., to Kalman Steel Corp., Bethlehem, Pa.; Batson-Cook Co., West Point, Ga., general contractor. Virginia Bridge & Iron Co., Roanoke, Va., awarded 80 tons of structural steel.

125 tons, grade school, Champaign, Ill., to Concrete Engineering Co., Chicago.

110 tons, reservoir, Maywood, Ill., to Concrete Engineering Co., Chicago.

100 tons, Nevada Street School, Newton, Mass., to Morrison & Stevens, Boston.

100 tons, bath house, Saratoga, N. Y., to Republic Fireproofing Co., New York; through George A. Fuller Co.

Unstated tonnage, grade separation, Nassau county, New York, to Igoe Bros., Newark, N. J.; through J. F. Crandell Corp.

Reinforcing Steel Pending

600 tons, pier sheds for New York; bids in.

400 tons, auditorium, San Jose, Calif.; bids opened but exceeded estimate, and new bids to be taken.

200 tons, Jamestown, N. Y., high school; bids July 12.

150 tons, Fourteenth street overhead, Sheboygan, Wis.; bids July 11.

150 tons, bridge, Big Timber creek, Camden-Glouster counties, New Jersey; bids July 23.

127 tons, M street bridge over Sacramento river, Sacramento, Calif.; George Pollock Co., Sacramento, low for general contract.

Unstated tonnage, five 50-foot deck girder spans, one 120-foot steel pony truss span and one 31-foot steel I-beam span on concrete substructure, Ohio county, West Virginia; public works projects NRM-203-C and NRH-203-D, bids to state road commission of West Virginia, Charleston, W. Va., July 17.

Unstated tonnage, mill foundations for Youngstown Sheet & Tube Co. strip mill, Campbell, O.; foundations to be 85 feet wide, 1500 feet long; Rust Engineering Co., Pittsburgh, contractor.

Wire

Wire Prices, Page 55

Pittsburgh—The market is now uniformly on the basis of 2.30c for plain wire and $2.60 per keg for nails, carload lots, Pittsburgh or Cleveland base. Although third quarter contracting has been slow this had been generally expected as the market was considerably overbought through June.

Cleveland—Wire rods, wire and wire products prices have not been reduced, but other steel price reductions have tended to make buyers cautious. Few orders have been booked for this month or third quarter, and light demand is anticipated for several weeks.

Boston—Wire mill operations are down sharply in most departments with little business booked since the first of July. The extent of the lull in wire drawing schedules is uncertain, depending largely how soon second quarter shipments are completed.

Chicago—Wire demand is light and shipments have declined sharply from the June rate. Prices are unchanged but lower quotations on other steel products are causing some uncertainty. Consumption of manufacturers' wire is fairly steady but is expected to recede this month, while no improvement in demand for wire products in agricultural districts is in early prospect.

New York—Bids close July 19 on cables for the Hell Gate suspension span of the Triboro bridge, taking a

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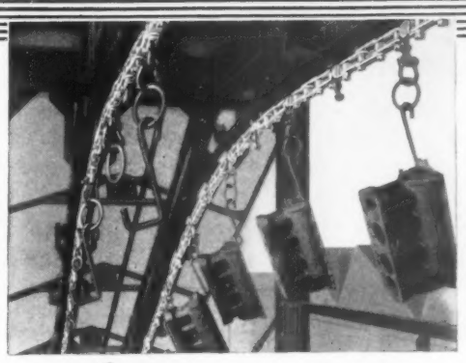

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large tonnage, although below the first estimate, two cables being used instead of four as originally planned.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 55

Contracting for third quarter has been in fair volume in the Pittsburgh district since the announcement recently of unchanged prices in bolts, nuts and rivets. However, specifications against contracts and spot business has been exceedingly slow so far in July.

Chicago suppliers find specifications lighter and third quarter contracting only fairly active. Railroad needs aid in keeping up activity.

The large rivet market holds at 3.00c, Pittsburgh, and 3.10c, Chicago, with small rivets 70 and 5 off. The discount on bolts and nuts remains at 70 off list.

Cold Finished

Cold Finished Prices, Page 55

Pittsburgh—The recent advance of $2 a ton in cold-finished alloy steel bars was short-lived and last week a reduction by the same amount placed the market again on a 2.95c, Pittsburgh, base. However, no developments have occurred in the cold-finished carbon steel bar market, which is 2.10c base, Pittsburgh. Automobile concerns and miscellaneous manufacturers appear to be entering fewer specifications for cold-drawn bars.

Tin Plate

Tin Plate Prices, Page 54

Pittsburgh—A reduction of $2 a ton has been made in the No. 28 gage base price of tin mill sizes of black sheets, making the market now 2.75c, Pittsburgh, while a $4 a ton reduction was made last week in No. 24 unassorted long ternes now quoted 3.45c, Pittsburgh. The market on tin plate remains unchanged at $5.25 per base box, Pittsburgh.

Most tin plate producers closed their plants last week. When they resumed on July 5 and July 9, the average of operations in the tin plate producing industry was estimated at 50 per cent.

New York—Tin plate specifications, not being affected by quarterly contracting, are holding up better than those in other leading steel products, but are lower than a week ago.

May Unemployment Shows Reduction From April

Unemployed workers in May numbered 7,899,000, a decline of 50,000 or 0.6 per cent from April and 5,304,000 or 40.2 per cent below the all-time peak unemployment of March, 1933. The rate of decrease in unemployment has been slowing down, the National Industrial Conference board, New York, notes, the decrease of 50,000 in May comparing with 72,000 in April and 589,000 in March.

F. G. Pardee, state mine appraiser for Michigan, has announced a tentative 1934 valuation for mines and reserves of $63,005,000, a reduction of $3,935,000 from 1933.

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Pig Iron

Pig Iron Prices, Page 56

Pittsburgh — Although demand for foundry iron is extremely dull as the present quarter begins, two large nonintegrated steelworks here are sounding out the market. One, A. M. Byers Co., has just completed shipments on a contract for bessemer iron that dates to June, 1933; the other, Allegheny Steel Co. is not actually inquiring for its needs, but is watching for possible price developments. The market, however, remains unchanged at $18 on basic, $18.50 on foundry grades and $19 for bessemer, all Neville Island base. Shenango Furnace Co. banked its one active Sharpsville, Pa., blast furnace last week.

Cleveland — Pig iron shipments moved up to a new peak for the year on the last day of July, since which time the movement has slowed to the lowest point. Blast furnaces are operating at a slower rate, and it is probable that some will be banked this month. The market now is $18.50, base, Cleveland, Toledo, Erie, Pa., and Detroit, for No. 2 foundry iron, an advance of $1 a ton over the level at which most tonnage was booked in the second quarter. New orders are scarce.

Chicago—Some small contracts for third quarter pig iron have been placed, while shipments are at a sharply reduced level compared with the rate during the preceding several months. In a number of instances small consumers cancelled tonnages under contract for second quarter delivery and have taken new contracts for this material to be delivered during the current quarter. Cancellations among larger consumers were few and such interests have fairly large stocks on hand. Changes in foundry operations generally are small but the tendency in operations still is downward. Pig iron continues $18.50, furnace, for No. 2 foundry and malleable, with two merchant stacks in this district still in blast.

Boston—Pig iron buying is light with most consumers covered through July on iron taken in during June. Foundry melt is light and is gradually declining. Scrap prices, which have failed to advance materially, retard pig iron sales.

New York—Trading in pig iron is negligible, with most consumers well covered for the time being as a result of heavy releases against second quarter contracts. Sellers look for little improvement before next month.

Cincinnati—Few new sales have been made and shipments have dropped abruptly. Prices of both northern and southern iron are firm at scheduled figures.

St. Louis — Bookings for third quarter delivery are light and most melters' stocks are unseasonally high. Melt in the district has tapered off, some foundries having closed down all of last week.

Buffalo—Second quarter shipments of iron from Buffalo furnaces were the best this district has had in three years or more. June also established a single month record for the period. Republic Steel Corp. now has only one blast furnace in operation here, reducing the nummber of active units in the district to five.

Birmingham, Ala—Some furnaces are completing deliveries for second quarter, a strike clause in contracts allowing delivery after the turn of the month. Deliveries have been heavy recently. Republic Steel Corp. shortly will begin shipments of iron

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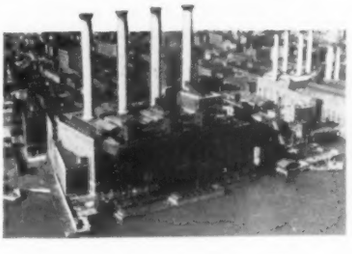

★ *Main illustration: Battery of Sturtevant Induced Draft Fans, a few of the 47 Sturtevant Fans at Hudson Ave. Station, Brooklyn Edison Company.*

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from its Thomas furnaces here to its northern works.

Toronto, Ont.—Business in the Canadian pig iron markets is spotty. No large tonnage or future delivery contracts have been placed. The daily melt is holding between 35 and 40 per cent.

Scrap

Scrap Prices, Page 57

Pittsburgh—Railroad lists, including those of the Baltimore & Ohio, Pennsylvania, New York Central, Chesapeake & Ohio, Nickel Plate and Pere Marquette, all to be closed on before July 13, are expected to provide a test of the market. No. 1 heavy melting steel, quoted at $11.75 to $12.25 for local delivery is based on recent small sales to a leading interest at $12 but little other buying interest is evident. A down-river mill recently bought 2000 tons of hydraulic compressed sheets at $11.75 and $12.

Cleveland—Shipments of steel and iron scrap are few and mostly of small lots. Prices show strength and owners of scrap are not selling at current prices. Offers by a consumer to buy heavy melting steel at $9 have brought no response.

Chicago — Scrap still is marking time, with demand light. While weakness predominates, prices nominally are unchanged. Prices bid on recent offerings of railroad scrap were lower than those a month ago, but consumer buying has developed no revision in the $9.50 to $10 range on No. 1 heavy melting steel.

Boston—New England consumers of scrap are taking light shipments with heavy melting steel unchanged. Following the shipment of close to 1000 tons of No. 2 steel by barge to eastern Pennsylvania, a similar tonnage of No. 1 steel for the same district was booked. The local pipe foundry has bought small lots of stove plate and No. 2 cast.

New York—Scrap continues dull, with prices barely holding. Cast grades and steel shafting tend to be easier. Some shipments continue to eastern Pennsylvania by rail, material coming largely from Northern New Jersey.

Philadelphia—Weakness has developed in several grades of scrap, accompanied by light demand. Borings and turnings, No. 1 cupola cast, No. 2 heavy melting steel, shafting, specification pipe, stove plate, machine shop turnings and No. 1 railroad wrought are among the grades off 50 cents to $1 a ton.

Buffalo — Sales and shipments of scrap to steelworks have been suspended completely during the shut down. Markets are nominal.

Detroit — Though quotably unchanged, the steel and iron scrap market is slightly easier as offerings have increased and steelworks consumption is down considerably. However, consumers buying prices have not changed.

Cincinnati—Mills continue out of the market for iron and steel scrap and prices are nominal, with dealers marking time.

St. Louis—The steel and iron scrap market continues quiet, dealers and melters marking time. Mills, with one exception, have made no purchases of consequence in some time.

Birmingham, Ala. — Larger consumers of heavy melting steel indicate no interest in the market. The market is slow but quotations holding.

Toronto, Ont.—Some dealers report improvement in demand for iron and steel scrap with larger shipments while others state that business is dull. There is some movement of steel scrap to the Montreal district for trans-shipment to Great Britain, but Canadian mills are out of the market, except when special grades are required.

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Metallurgical Coke

Coke Prices, Page 55

Shipping suspensions increased in number in the coke market last week. A Sharpsville, Pa., blast furnace shut off shipments and several other consumers through the Western Pennsylvania and Ohio districts curtailed.

Beehive coke for furnace use is quoted $3.85, Connellsville ovens, with foundry coke $4.60, both for immediate shipment. For contracts, furnace coke is quoted $3.60 per ton.

At Chicago shipments of by-product foundry coke continue their decline, June volume being about 15 per cent below that of May. The quotation for July is $8.50, ovens, for outside delivery and $9.25, delivered, Chicago.

Specifications for by-product coke at Cincinnati are lighter and prices are unchanged. Some contracts for third quarter coke have been booked by producers at Birmingham, Ala., and production is steady.

Warehouse

Warehouse Prices, Page 58

Pittsburgh—Shipments of warehouse steel products dwindled in volume last week and sales were as poor as any week since the Christmas-New Year's week. Some revisions in warehouse steel prices are in prospect following the recent reduction in hot and cold-rolled mill prices.

Cleveland—Warehouses here have readjusted prices in accordance with mill reductions, ranging from $1 to $4 a ton. Business for first half of the year exceeded that of either the first or second halves of 1933. In June the number of orders dropped considerably, but tonnage showed little change from May. Currently, the market is dull.

Chicago—Prices have been reduced $1 to $4 a ton, matching the reductions announced recently in mill quotations. Bars, shapes, plates, strip and sheets, including galvanized, are affected. Sales are lagging slightly but are considerably better than mill demand.

New York—Warehouse prices are being revised downward, following filing of lower quotations by mills. Effective July 3, bars, plates, shapes, bands, blue annealed sheets and floor plates are lower in the New York metropolitan district. Buying is light.

Philadelphia — Reductions have been made in warehouse prices of $1 to $4. Trading is quiet although some sellers report business of first half at 75 to 80 per cent better than for the corresponding period of 1933.

Detroit—With many leading motor plants and parts suppliers closed through all of last week, warehouse demand was light. July jobbing business starts with the virtual loss of a full week.

Cincinnati — Warehouse prices were lowered, effective July 3, following mill revisions. Demand has been well sustained, but adversely affected by the holiday.

Iron Ore

Iron Ore Prices, Page 56

Cleveland—The market for Lake Superior iron ore is quiet, practically all users having specified their requirements for this season. Stocks at some steel works are unusually low, and shipments are expected to continue to increase. The tonnage moved by vessel from upper lake ports in June was 4,460,807 tons, slightly higher than the estimate of 4,400,000 tons given in STEEL last week. This was nearly three times the amount shipped in June last year. For the season to July 1 shipments have totaled 7,091,385 tons, compared with 4,826,372 tons in the same period of 1933.

Semifinished

Semifinished Prices, Page 55

Price reductions of $2 a ton late last week in alloy billets, slabs and ingots, effective July 13, followed upon a $2 a ton cut in carbon billets and slabs to $27, Pittsburgh, the latter effective July 10. Other reductions in the semifinished market last week included $2 on sheet bars to

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NILES, O.

$28, Pittsburgh, and $2 on tube rounds to 1.90c, Pittsburgh, with skelp remaining 1.70c and wire rods $38, Pittsburgh or Cleveland. Several orders for sheet bars and skelp individually totaling around 3000 tons are included in this week's rolling schedules at Pittsburgh.

Nonferrous Metals

Nonferrous Metal Prices, Page 56, 57

New York—Lead moved in substantial volume last week but demand for other metals remained quiet. Little change in prices was apparent but the tendency appeared to be slightly upward.

Copper—Consumers came into the market for only a few tons of metal daily but this was not unexpected in view of the heavy coverage prior to the price advance to the 9-cent level. No immediate advance in prices is in sight although prognosticators are looking for an ultimate rise to at least 12 cents. A seasonal tapering is noted in operations of fabricators but this probably will be less than average. Export prices on copper have been declining due to the critical political situation in Germany. This has had a weakening effect on domestic scrap. More copper consumers in this country have signed up to use only blue eagle metal.

Lead—Consumers have been actively in the market for July and August requirements. The buying reflects the $5 a ton cut late in June and inadequate coverage in most consuming lines.

Zinc—Prices appeared firmer due to inauguration of a drastic curtailment plan in the Tri-State ore producing district. According to surface indications, buying was light but it was understood that considerable business was placed quietly.

Tin—Spot Straits metal advanced to approximately the 52-cent level by the close of the week. A few lots were traded daily but total volume of business done was relatively insignificant. Tin deliveries in the United States declined to 3845 tons in June from 4110 tons in May and 6145 tons a year ago.

Aluminum—Easiness was noted in secondary grades. Virgin metal was quiet.

Antimony—Spot metal was available at 7.75c, duty paid, but some sellers were asking higher prices. Little trading was done.

Coke By-Products

Coke By-Product Prices, Page 55

New York—With output declining steadily, distillate prices are firm. Phenol demand is fairly steady, but naphthalene volume is light. Spot business is fairly active for this period.

Quicksilver

New York—A slightly firmer undertone is developing in the quicksilver market. Small lots are unchanged at $75.50 in a generally quiet market, but round lots are generally held at $75, a virgin flask of 76 pounds, up 50 cents.

Pacific Coast

Pacific Coast Prices, Page 55, 56, 58

San Francisco—*(By Air Mail)*—During the first half of 1934 bookings of cast iron pipe, reinforcing bars, plates and structural shapes on the Pacific coast were at the highest point since 1930. Awards of reinforcing bars aggregated 61,118 tons, the largest for any six months in the records of the coast industry. Despite the fact the stevedores' strike has seriously hampered delivery from eastern steel mills, demand is well maintained and over 91,000 tons of reinforcing bars, plates and shapes are now pending.

Bids have been opened on 400 tons of reinforcing bars for an auditorium in San Jose, Calif., and on 127 tons for a bridge at Sacramento. New inquiries include 937 tons for the Parker dam in Arizona and 373 tons of mild steel bars for trash racks for the same project. Pending business in reinforcing steel exceeds 35,000 tons.

Bids will be opened July 26 for 1025 tons of plates for gates for the Parker dam in Arizona, and July 6 for 900 tons for the Sunset pipe line, San Francisco. Pending business aggregates over 9000 tons of plates.

Virginia Bridge & Iron Co., Roanoke, Va., secured 450 tons of shapes for bridges over the Truckee river in California for the Southern Pacific Co., San Francisco. Pacific Coast Steel Corp., Los Angeles, took 340 tons for a chemistry building addition for the University of California, Los Angeles. George Pollock Co. is

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low on 2213 tons for the M street bridge, Sacramento, Calif. Pending business involves more than 47,000 tons of shapes.

The largest cast iron pipe award of the year, placed during the week, is for 9300 tons for San Francisco, of which United States Pipe & Foundry Co. took 5700 tons, National Cast Iron Pipe Co. 2100 tons and American Cast Iron Pipe Co. 1500 tons. Whittier, Calif., awarded 256 tons to the United States Pipe & Foundry Co.

Strike Halts Deliveries

Seattle—End of the second quarter finds Pacific Northwest business hopeful, notwithstanding seven weeks of labor disputes which have practically stopped all water transportation. Recovery was showing increased momentum until the walkout. The effects of the strike are far reaching as they have closed many industrial plants which in the meantime are out of the market for steel products.

Two large plate jobs are inviting attention. Tacoma will open bids July 10 for 18,940 feet of 52 to 63-inch steel pipe, the first unit of the Green River pipe line improvement, $350,000 being immediately available. Figures are asked on steel and on concrete pipe. One of the country's largest siphon jobs will soon be undertaken in Oregon on the Owyhee reclamation project. Bids will be received in about two months for a 4½-mile pipe line over the Malheur valley, leading from the Owyhee canal.

The Austin Co., Seattle, has the contract for remodeling and extensions at the plants of the Grays Harbor Pulp & Paper Co., Hoquiam, Wash., and Rainier Pulp & Paper Co., Port Angeles, Wash. Small tonnages of shapes and reinforcing bars are involved.

The government has officially awarded to the Columbia Construction Co., Reno, Nev., the contract for construction of the main spillway dam at Bonneville, Oreg., on a low bid of $8,972,650. The work calls for 6000 tons of reinforcing and 2450 tons of shapes.

There is more interest in cast iron pipe but several awards have been delayed as suppliers cannot guarantee delivery owing to interruption of water transportation. Stocks are practically exhausted. Contracts at Snohomish and Auburn, Wash., have not been awarded for this reason. Tonasket, Wash., will receive bids July 10 for 200 tons of 4, 6 and 8-inch cast iron pipe. Chehalis, Wash., will hold a special election July 17 to pass on a proposed $110,000 bond issue for water mains, to which the government will add $33,000.

Scrap exporters are handicapped by lack of transportation. No new business is being accepted pending forwarding of orders on hand.

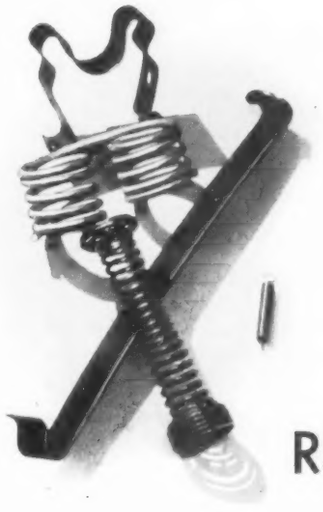
Steel in Europe

Foreign Steel Prices, Page 58

London (*By Cable*)—Steel and iron markets in Great Britain are quiet, but many mills are busy with contracts previously booked. The general position is fairly satisfactory. A Midland works has booked an or-

RAYMOND

Springs



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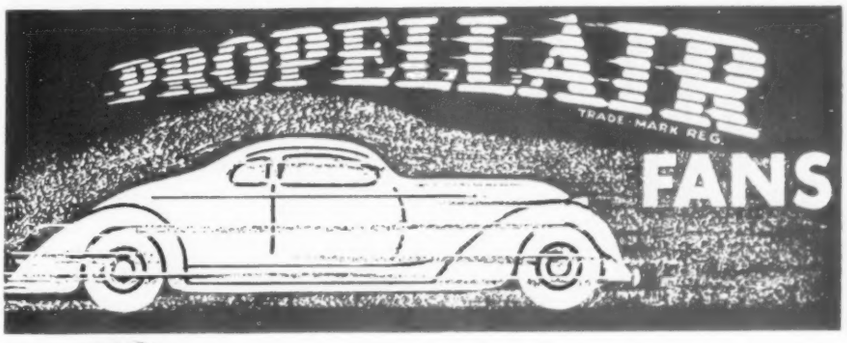

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der from a railroad in China. Some semifinished steel is being imported from the Continent as the price is favorable. The sheet trade is dull.

The Continent reports some activity in demand for export, especially from Japan, Russia and the Far East.

Freight car loadings of seven leading western railroads in 1933 were 1.8 per cent less than in 1932.

Here and There In Industry

(*Concluded from Page* 18)

McGregor Engineering Co., 213 Midco building, Tulsa, Okla., its representative in Oklahoma, northern Arkansas and the Texas panhandle for the sale of high pressure, high temperature valves for refinery and boiler plant service.

□ □ □

Hydro-Ash Corp. has moved its offices to 53 West Jackson boulevard, Chicago. The company recently took over the manufacturing and sales rights in the United States of the Leach powdered coal burner.

□ □ □

Thomas Spacing Machine Co., Pittsburgh, has been awarded a contract for operating machinery for the Montgomery island locks in the Ohio river below Pittsburgh by the war department on a bid of $42,333.

□ □ □

Max Solomon Co., Oliver building, Pittsburgh, has bought the plant of the Lehigh Valley Coal Sales Co., near Buffalo, and will wreck the structure. It is estimated there are 3000 tons of steel in the building. Coal conveyors with large capacity are in the plant.

□ □ □

Peterson Cutting Die Co., 864 East Ogden avenue, Milwaukee, manufacturer of steel dies for shoe and glove factories and similar uses, has moved to new quarters at 1929 North Buffum street, increasing its manufacturing space from 34,000 to 90,000 square feet.

□ □ □

Bolens Mfg. Co., Port Washington, Wis., manufacturer of castings and hardware for revolving and tilting office chairs, is meeting the best demand for its products in four years. This firm is credited with producing about 75 per cent of such hardware in this country.

□ □ □

Process Molds Inc., 1700 North Harrison street, Fort Wayne, Ind., recently incorporated by J. W. Bishop, vice president, and associates, will engage in the manufacture of thermoplastic molds by a process new in this country.

□ □ □

Leonard Refrigerator Co., Detroit, established its best record for shipments in May, at 42.3 per cent above its previous highest mark, attained in May, 1933. Shipments for the first seven months of the company's current fiscal year are 68.3 per cent higher than for the corresponding portion of the previous year.

□ □ □

Oliver Farm Equipment Co., Chicago, manufacturer of agricultural machinery, has shipped from its Hart-Parr division at Charles City, Iowa, eight tractors to foreign countries. Six went to Stockholm, Sweden, one to Lima, Peru, and one

NONSHRINK OIL HARDENING

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Manufacturers of BISCO Tungsten Carbide drawing dies for wire, rod and tubing.

A saving will be realized by using our Tool Steel Tubing. Carried in stock up to 12″ O.D. x 2″ wall thickness. Larger sizes can be supplied. This tubing is excellent for all classes of dies, slitters, spacers, bushings, etc.

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to Arequita, Peru. This is the fourth tractor shipment to Sweden this year.

□ □ □

Hoffman & Billings Mfg. Co., 206 East Beecher street, Milwaukee, established in 1855, manufacturer of plumbing supplies, is discontinuing business as a manufacturer and has sold to the Kohler Co., Kohler, Wis., its entire line of shower bath fixtures, shower stalls and hospital fittings, including exclusive licenses covering all patents on a large number of products invented by Edward F. Niedecken, president.

□ □ □

Anaconda Sales Co., subsidiary of the Anaconda Copper Mining Co., Anaconda, Mont., has taken over sales of all metals and metal products manufactured by the latter, succeeding the United Metals Selling Co., another subsidiary. This places sale of all products of the Anaconda group under the Anaconda trade name. Fabricated products of American Brass Co. and Anaconda Wire & Cable Co. will be sold by those companies.

□ □ □

Perfex Corp., 415 West Oklahoma avenue, Milwaukee, manufacturer of heavy duty radiators for trucks and tractors, air conditioning systems and similar products, has sold its business to interests represented by Julius K. Luthe, formerly vice president and director of the Minneapolis-Honeywell Co., Minneapolis, who will be president and treasurer of the new company, known as Perfex Radiator Co. R. W. Wilson is vice president and L. J. Burlingame is secretary.

□ □ □

Meriam Co., Cleveland, has practically doubled sales of its flow and pressure meters the past three months and other departments are also increasingly busy. Demand from the South and Southwest is particularly heavy. Recent sales include a 175-horsepower unit for the Peyton Packing Co., Littlefield, Tex.; 350-horsepower generating unit for the Pacific American Gasoline Co., Borger, Tex.; 175-horsepower unit for the West Texas Gin Co., Quanah, Tex.; 70-horsepower generating unit for Dallas Cotton Mills, Dallas, Tex. A second 125-horsepower engine will be shipped shortly to the Natchitoches Cotton Oil Co., Natchitoches, La.

□ □ □

Stewarts & Lloyds Ltd., Birmingham, Eng., lighted the first blast furnace of its Corby works, near Kettering, Eng., May 8. This is the first unit of the new works to be put into commission. It was designed and built for its special work by H. A. Brassert & Co., engineers, Chicago, and is the first of its type in Great Britain. It has new features in its lines, cooling system, charging and hot blast equipment. A somewhat larger unit is now under construction, to be put into commission in the fall. Output of the two stacks will supply iron for the new Corby steelworks, the first plant to be established on the Northamptonshire ore field, and will produce steel by the bessemer process.

□ □ □

Whiting Corp., Harvey, Ill., manufacturer of cranes, foundry equipment and railroad specialties, is celebrating in 1934 the fiftieth anniversary of its founding, with John Hill Whiting, its founder, still active as chairman of the board. Beginning as clerk in a carwheel foundry in Detroit, Mr. Whiting developed several improvements in cupola construction and other new devices and founded the Detroit Foundry Equipment Co.

After the Columbian exposition of 1893 at Chicago had called attention to that city as the business center of the West, Mr. Whiting decided to establish his business in that area and in 1894 built a portion of the present plant at Harvey, Ill., a suburb of Chicago. The new company was known as the Whiting Foundry Equipment Co., the name being changed later to its present form. Numerous companies have

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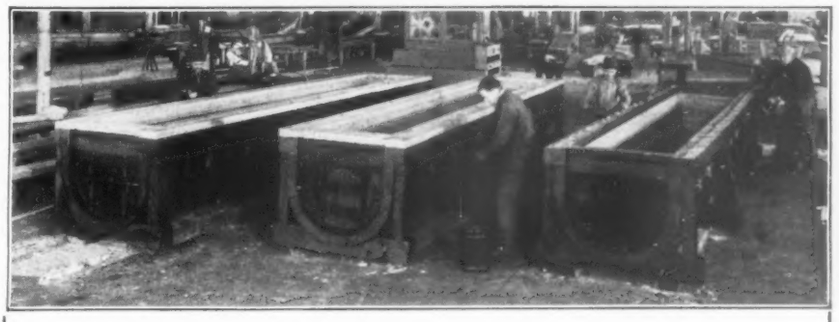

ASSEMBLING Three 4'-Yellow Pine Seamless Tube Pickling Tanks before delivery to Customer.

Tanks are 18'3" long. Two are completed and one shows installation of our special Wood Lining, designed to protect the tanks from abrasion.

Your inquiries for all Pickling Tanks—Light or Heavy duty respectfully solicited.

G. WOOLFORD WOOD TANK Mfg. Co.

Factory: Darby, Pa. Paschall P. O., Philadelphia

When you think of Wood Tanks Think of Woolford Tanks

been absorbed to add their specialties to the Whiting line. Gen. T. S. Hammond is president, having served the company for 30 years, and Stevens H. Hammond, grandson of the founder, is assistant to the president.

New Trade Publications

(*Concluded from Page* 51)

under varying conditions of temperature and concentration.

CONDENSERS—A patented folded tube layer type of surface condenser with welded steel shell is illustrated and described in a current bulletin by the Worthington Pump & Machinery Corp., Harrison, N. J. Another bulletin by the same producer relates to single and two-stage belt-driven and direct-connected horizontal duplex type refrigeration compressors, equipped with feather valves.

MOTOREDUCERS—Vertical motoreducers as built by the Falk Corp., Milwaukee, are illustrated and described in Bulletin No. 271 of that company. Much information is presented, with data, tables and diagrams.

TUBE COUPLINGS—Bulletin No. 35 by the Parker Appliance Co., Cleveland, is devoted to its tube couplings and associated equipment. It lists the products and contains much information on installation of plumbing with these devices.

SPECIAL STEELS — Firth-Sterling Steel Co., McKeesport, Pa., presents in two folders the claims of its chisel and punch steel and its A. S. V. steel, a "center free" steel for various uses in shop operation.

MOTORS—A bulletin on overheating of motors and the consequent ills, with its system of protection has been issued by Lincoln Electric Co., Cleveland. Construction features to bring this result are listed and data tables are included.

PULVERIZED FUEL—Foster Wheeler Corp., 165 Broadway, New York, describes its pulverized fuel equipment, including two types of mills for pulverizing fuel. Space is also given to auxiliary equipment for constructing complete systems.

AIR SANDERS—A device for air rubbing, polishing and sanding castings and small metal parts has been issued by the Paasche Airbrush Co., 1909 Diversey Parkway, Chicago. Ample illustrations make clear the action of this device.

BRONZE—Catalog No. 20 by Ampco Metal Inc., Milwaukee, describes its uses in modern industry. The 32 pages of this catalog are full of information on advantages of the use of bronzes in industry.

ELECTRIC TOOLS—Stanley Electric Tool Co., New Britain, Conn., has issued its catalog No. 64, covering its line of electric tools of various types, with illustrations, diagrams and tables of specifications.

ROLLER BEARINGS—Bantam Ball Bearing Co., South Bend, Ind., has published a catalog of its tapered roller bearings, giving load capacities and other information. More than 1500 bearings are listed in detail. A table of safety factors in three types of service is included.

TRAMRAIL — Stressing safety and service from its tramrail products Cleveland Tramrail division of Cleveland Crane & Engineering Co., Wickliffe, O., in a current bulletin goes into much detail in illustration and description of its equipment.

Unless your men working on hot jobs are adequately cooled (especially in hot weather) you must stand the loss of their greatly reduced working efficiency. Coppus heat killers deliver a cool refreshing stream of air right to the "Hot Spot".

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Equipment

Pittsburgh — Last week National Steel Corp., Pittsburgh, confirmed circulation of an inquiry for the construction of a new continuous hot and cold strip mill for the company's Great Lakes Steel division at Detroit, estimated to cost between $12,000,000 and $15,000,000. United Engineering & Foundry Co., Mesta Machine Co. and other equipment builders received the inquiry, which was for a continuous mill rolling up to 75 inches in width. Presumably this will replace mills of the present Michigan Steel Corp. division of Great Lakes Steel Co., which can roll up to approximately 60 inches wide.

Rust Engineering Co. here has been awarded contract from the Youngstown Sheet & Tube Co. for the foundations to its strip mill at Struthers, O. The mill building will be 85 feet wide by 1500 feet long, with a motor room 65 feet wide by 650 feet long. The Rust company is now completing foundation work for a new mill of the Wheeling Steel Corp. at Yorkville, O.

Chicago — Machinery and plant equipment sales continue moderately below the rate of a month or two ago, with the June volume in a number of instances the lightest of the second quarter. Inquiries also are less active than was true a short time ago, although a fair volume of business is pending.

Outstanding in the machine tool market is the prospective inquiry for the Lane Technical high school. Funds for the equipping of this school now are available and about $225,000 will be spent for 140 lathes in addition to a smaller number of milling machines and other tools. Definite inquiries for this equipment are expected shortly. Railroads continue inactive in the machine tool market. The Wabash railroad and Kansas City terminal are in the market for track welders but inquiries otherwise are light. Steel plants are making few purchases of machinery, and demand for other equipment is of a miscellaneous nature.

Demand for used machinery has been declining during the past six months, buyers now showing more interest in purchasing new equipment. About 200 various machine tools will be sold July 10 at public auction at 627 West Lake street, the list including 50 automatic screw machines as well as lathes, drills and other types of tools.

Cleveland—Summer quiet prevails in machinery and equipment sales, although extensive retooling programs by automotive interests in Detroit are reported, which later may mature in business for equipment interests. Current sales continue to be for replacement needs and no sizable lists for new machinery appear to be up for quotations. Buyers are still hesitant over committing themselves to any heavy expenditures.

Boston — Orders and inquiry for machinery have slackened, shop equipment builders with few exceptions being less active. An exception is one of the largest textile machinery builders in the Worcester district which has bookings into September. Several New England machine plants are bidding on a large list of machinery for Russia, to be used in an extended aircraft building program. Grinding wheel demand holds fairly well and this branch of the industry is much more active than a year ago.

Construction and Enterprise

New York

BATAVIA, N. Y.—City is considering plans for a 1,500,000-gallon water storage tank to cost $100,000.

BROOKLYN, N. Y.—Durable Iron Craftsmen Inc. has been formed by Samuel M. Cirton, 231 Smith street and will engage in manufacture of ornamental iron.

BUFFALO, N. Y.—Linde Air Prodnets Co., 30 East Forty-second street, New York, has begun construction of a $20,000 addition to its Buffalo plant machine shop.

NEW YORK.—Chase Metalcraft Corp. has been organized by Maxwell Richter, 8 East Prospect avenue, Mt. Vernon, N. Y., and associates, to manufacture metal products.

NEW YORK.—Harlem Metal Corp., 594 East 133rd street, has leased space from Central Foundry Co. on Harlem river and will build 1-story units equipped with elevating and conveying equipment, at cost of about $40,000.

NIAGARA FALLS, N. Y.—Wright & Kremers, Niagara Falls, has submitted low bid of $143,900 for construction of an addition to municipal filtration plant. Norwood Engineering Co., Florence, Mass., was low at $81,300 for equipment.

New Jersey

MILLVILLE, N. J.—City commission is making a survey for municipal lighting plant and will apply to PWA for loan.

PAULSBORO, N. J.—Sandura Inc., R. G. Jackson, Finance building, Philadelphia, is having plans prepared by Ballinger Co., Twelfth and Chestnut streets, Philadelphia, for linoleum plant at Paulsboro, N. J., consisting of six buildings.

RAHWAY, N. J.—Merck & Co., Lincoln avenue, is planning general alterations to existing buildings and will erect five new manufacturing buildings. Bids will be opened in about a month.

WILLIAMSTOWN, N. J.—Williamstown Foundry Corp. is the name under which the new owners have reorganized the old Williamstown Foundry Co., Williamstown, N. J. Phillip E. Wright, Stephen Girard building, Philadelphia, is vice president, treasurer and general manager. The plant at Williamstown is engaged in production of soil pipe, fittings and plumbers' castings.

Pennsylvania

CLINTONVILLE, PA.—Machine shop of Lon E. Ridle recently was destroyed by fire.

EAST PITTSBURGH, PA.—Westinghouse Electric & Mfg. Co. has received $120,000 order for equipment to electrify the No. 1 mill of the American Boxboard Co., Grand Rapids, Mich. Equipment consists of 3000-kilowatt generator unit, single motor paper machine drive equipment, and various gear motors.

PHILADELPHIA—Moss Rose Mfg. Co., Hancock and Allegheny avenue, has awarded contract to Leonard Shaffer, Abbott building, Philadelphia, for construction of manufacturing plant.

PHILADELPHIA—E. I. du Pont de Nemours Co., Russell D. Rodgers, DuPont building, Wilmington, Del., has plans in progress for erection of manufacturing building at Thirty-fifth and Gray's Ferry avenue, Philadelphia.

PITTSBURGH—Pennsylvania railroad will build a cement conveyor and pile clusters for mooring barges near Conway, Pa., on the Ohio river, approximately 21 miles below Pittsburgh. Permission of the federal engineers at Pittsburgh has been requested.

Ohio

CINCINNATI — William Powell Co., manufacturer of brass and bronze valves and engine appliances, sustained damages due to an explosion in its test room.

CLEVELAND—W. J. Rogers, utilities director, has been instructed by city council to make a survey of expansion and general rehabilitation of municipal light plant. An ordinance authorizing issuance of $2,000,000 in bonds was passed. This program consists of building entire city light system, enlarging generating capacity, increasing distribution lines and erecting new power plants.

DAYTON, O.—Duriron Co., manufacturer of acid and alkali handling equipment, has started construction of an extension to its alloy steel foundry, and new equipment will be installed as soon as extension is under cover. Additional electric induction furnaces will be installed.

LIMA, O.—Lima Metal Products Inc. has been formed by Kent W. Hughes, Savings building, with $110,000 capital, to manufacture metal products.

PIQUA, O.—Piqua Emery Cutter & Foundry Co. has been incorporated by Charles Sheaf, Joseph Adlard, Frank Mikolajewski, Bernard S. Keyt and the Piqua National Bank & Trust Co.

Michigan

ADRIAN, MICH.—Adrian Spring Co., a new concern, will manufacture springs for automobiles and trucks. The plant is located in the former Consolidated Concrete Machinery Co.'s building on East Beecher street.

ANN ARBOR, MICH.—Ayers, Lewis, Norris & May, Ann Arbor, engineers, have prepared preliminary plans for a $125,000 power plant to be erected at Morenci, Mich.

ANN ARBOR, MICH.—Shoecraft, Drury & McNamee, Ann Arbor, engineers, have prepared plans for a sewage plant to be constructed at Monroe, Mich., at an estimated cost of $650,000. PWA loan for the project have been approved.

DETROIT—Ziegler-Hutter Breweries Inc., 1227 Detroit Savings Bank building, recently formed by George F., Albert E. and I. G. Hutter, 35 East Davidson street, Fond du Lac, Wis., is planning to construct a brewery building.

DETROIT—Vacuum Cup Metal Pulley Co. has been incorporated by William H. H. Wulf, 528 Maccabees building, to deal in tools and pulleys.

DETROIT—Detroit Broach Co. Inc. has been incorporated to manufacture broaches, by Gustav von Reis Jr., 6000 Beniteau avenue, Detroit.

DETROIT.—Superior Welding & Brazing Co., 6564 Russell street, has had plans prepared by Pollmar, Ropes & Lundy, Detroit, architects, for a factory addition.

DETROIT.—General Conveyors Corp., 1938 East Franklin street, has been incorporated by Erich A. Jastrow, 860 Nottingham road, Grosse Pointe Park, Mich., to deal in iron and steel work.

DETROIT.—American Malting Co., 1900 East Jefferson street, is planning to erect an extensive malting plant in Detroit, including a grain elevator, a malting department, two dry kiln floors and a power plant.

ECORSE, MICH.—W. S. Bache Co., 240 Salliotte road, has been formed by Harry A. McKnight, William C. Liddle and William S. Bache, 1277 Seventh street, Wyandotte, Mich.

GRAND RAPIDS, MICH.—Sorting Devices Co. Inc., 805 Michigan Trust

Snowden Samuel
President

S. A. Cochran
Vice Pres.

FRANK SAMUEL & CO., Inc.
Harrison Bldg., Philadelphia, Pa.

Alloys	Pig Iron	Muck Bars
Ferro Manganese	Low Phos	Low Phos and Special
Ferro Chrome	English	The American
Ferro Silicon	French	Swedo Iron Co.'s
Calcium Silicide		
Silico Manganese		

Manganese Ore	Iron Ores	Chrome Ore
Open Hearth Use		Lump
Blast Furnace Use		Ground

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PICKLING of Iron and Steel

By Wallace G. Imhoff

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The scope of the work may be inferred from the 15 chapter headings which include: Facts About the Steel and Iron Base and Iron Oxides and Scale; Acids, Bath Temperature and Pickling Time; Steam, Air and Agitation; Solutions, Tanks and Contaminations; Equipment and Production Principles; Compounds and Inhibitors; Fumes, Ventilation and By-Products; Chemistry of Pickling; Design and Construction of Pickling Tanks; Design of Pickling Departments; Pickling Steel and Copper for Tinning; and, Pickling for Zinc and Lead-Coated Sheets.

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building, has been incorporated by Willis R. Leenhouts, Grand Rapids, to develop sorting devices.

HIGHLAND PARK, MICH.—G. B. Purcell Inc., 15120 Woodward avenue, has been formed by G. B. Purcell, 646 Hazelwood avenue, Detroit, to manufacture machinery.

JACKSON, MICH.—PWA has approved funds to be used in construction of sewage plant here to cost about $800,000, including pumping station, control house and sewers.

PORT HURON, MICH.—Basshead Ale & Brewing Co. has been incorporated with $275,000 capital to operate a brewery, by Edgar W. Penton, B. W. Randall, and Antonio Vetrano, 4885 Algonquin avenue, Detroit.

SAGINAW, MICH.—Universal Water Purifier Inc., 2626 East Genesee, has been formed by S. A. Raymond, 1002 State street, to manufacture instruments.

WYANDOTTE, MICH.—City council has authorized L. J. LaCourse, city clerk, to advertise for bids for construction of 500,000-gallon water tank, first step toward construction of new water plant here.

Indiana

BLUFFTON, IND.—Grimes Machine Co. has been purchased by William Moser, Ray Ash, George Lautzenhiser and Fred Moser, who will incorporate and operate the foundry and machine shops under the name of Bluffton Foundry & Machine Co. George Lautzenhiser will be manager. The new company will make equipment for oil drilling and pumping equipment.

INDIANAPOLIS — Jenkins Motor Co. Inc., John W. Jenkins, president, has leased a manufacturing building at Twenty-fifth street and Ethel avenue and will manufacture a new type of automotive engine head.

Illinois

CHICAGO—Goodrie Cylint Flush Valve Co., 738 North Wells street, has been incorporated by Joseph J. Goodrie, Joseph M. Rosich and Peter I. Deoder to manufacture flush valves and other goods. Correspondent: Albert J. Fihe, 111 West Monroe street.

CHICAGO—Lake Machinery Co. Inc., 1140 West Lake street, has been incorporated by Mollie Velick, Albert Velick and Myron Schaffer to manufacture machinery and engines. Correspondent: Lewis W. Schlifkin, Suite 1027 Steuben building, 188 West Randolph street.

CHICAGO—Sellers Engineering Co., 2415 North Ashland boulevard, has been formed by O. N. Sellers, C. E. Wilson and C. F. Sellers to manufacture and repair gas boilers, gas burners, gas combustion units, etc. Correspondent: Thompson, Chambers & Thompson, 100 North LaSalle street.

CHICAGO—Ackles Nornkohl Co., 6112 North Mozart street, has been organized by Alex C. Nornkohl, Virgil E. Ackles and Grace Ackles, to manufacture machines, implements and utensils used in connection with baking industry. Correspondent: Morris Levy, 134 North LaSalle street, Suite 1114.

CHICAGO—Holland Co., 332 South Michigan avenue, has been incorporated by Cyrus J. Holland, Gordon R. Close and Graydon H. Ellis, to deal in machinery ,appliances, mechanical devices, mechanical parts and equipment Correspondent: Lord, Lloyd & Bissell, Field building, 135 South LaSalle street.

CHICAGO.—Bagby & Co., 565 West Washington boulevard, has been incorporated by R. V. Bagby, Anne R. Bagby and E. Hochmuth, to manufacture and deal in machinery, appliances, parts and accessories. Correspondent: J. E. Bach, Beach, Fathchild & Scofield, Continental Bank building, 208 South La Salle street.

Oklahoma

DEER CREEK, OKLA.—Town has allotment of $25,000 for waterworks system. C. H. Burlingame, town treasurer.

KAW, OKLA.—W. C. Baum, Kaw City, is considering construction of hydroelectric project on Western Osage between Kaw City and Fairfax. Plans have been completed and project is now in hands of Arkansas river flood control commission. Power plant will be located about three miles from Fairfax. Estimated cost $3,500,000.

Texas

AUSTIN, TEX.—PWA has approved loan of $4,500,000 for completion of Hamilton dam power project on Colorado river northwest of Austin. Colorado River Co., San Antonio, Tex., will act as agency to carry on work, pending creation by Texas legislature of public authority to take it over.

DALLAS, TEX.—City, John N. Edy, city manager, has allotment of $21,000 for sewage pumping station improvements. Will call for bids in about two weeks on work to cost $70,000.

Alabama

CASTLEBERRY, ALA.—City has loan and grant of $26,000 for waterworks system, including pump house and pumping equipment.

FAIRHOPE, ALA.—Town has loan and grant of $120,000 for waterworks system, including elevated tank and tower, distribution system, etc.

LINCOLN, ALA.—Town has had PWA loan and grant approved of $30,000 for waterworks system, including storage tank, distribution system, chlorinator, etc.

TROY, ALA.—City has loan and grant of $68,000 for gas generating plant and distribution system.

VINCENT, ALA.—Town has loan and grant of $28,000 for improvements to waterworks system, including construction of pumping station, elevated storage tank and extension to distribution system.

District of Columbia

WASHINGTON—Division of purchases and sales, department of commerce, will receive bids until July 13, proposal 26240, for not less than ten galvanized steel skeleton towers and accessories.

Florida

PAHOKEE, FLA.—Smith-Hendrix Co., Jacksonville, Fla., is low bidder at $75,000 for waterworks, not including tank. Rafn & Main, Daytona Beach, Fla., architects.

Georgia

CORNELIA, GA.—City will have plans ready for bids about July 20 for waterworks system. PWA has approved loan and grant of $90,000. Robert & Co., Bona Allen building, Atlanta, Ga., engineer.

NACOOCHEE, GA.—Tesnatee gold, gravel and sand interests, represented by Bean Creek Gold Mines, Nacoochee, plan installing centrifugal pumps of 1000 and 1500-gallon capacity, dragline machines, etc.

Kentucky

FRANKFORT, KY.—Kennebee Distillery, Carl J. Kiefer, Schmidt building, Cincinnati, O., plans $150,000 extension and improvement to plant.

FRANKFORT, KY.—Original Old Taylor Distillery has been incorporated by Courtney Combs and Thomas G. Bartlett.

LOUISVILLE, KY.—Nugent Sand Co. plans replacing burned equipment, including terminal loading and conveying machinery, derrick boats, etc.

TOMPKINSVILLE, KY.—City, James C. Carter Jr., mayor, has grant of $50,000 for waterworks system.

Louisiana

PATTERSON, LA.—Acme Veneer Co. Inc., J. Ross Holcomb, manager, will rebuild burned single ply veneer mill and wants 66-inch Blakeley back roll lathe and 100 to 150-horsepower diesel engine.

North Carolina

WAYNESVILLE, N. C.—J. Wilford Ray, T. H. Rogers and associates are considering construction of cannery between Waynesville and Hazlewood, 40 x 100 feet, to cost about $10,000. J. E. Barr will supervise construction.

South Carolina

WILLIAMSON, S. C.—City, H. V. G. Cooley, mayor, will receive bids July 17 for waterworks and sewer improvements, including 75,000-gallon elevated tank, 15,000-gallon wash tank, and centrifugal pump.

West Virginia

HUNTINGTON, W. VA. — United States engineer, will receive bids July 11, circular 34-176, for simplex vertical feed pump; circular 34-177, for 30 boiler tubes.

Virginia

FRANKLIN, VA.—Camp Mfg. Co. wants prices and data on one horizontal tank or ,cylinder to carry 150 pounds or more water pressure, one flat tank of 30,000-gallon capacity and two round vertical tanks each of about 20,000-gallon capacity.

RICHMOND, VA.—Virginia Airship Co. Inc., Garrette W. Peck, president, plans establishing plant for manufacture of all-metal, lighter-than-air dirigibles, diesel engines and planes.

RICHMOND, VA.—DuPont Rayon Co. is constructing a $5,000,000 unit at Amphill, a suburb. At Waynesboro,

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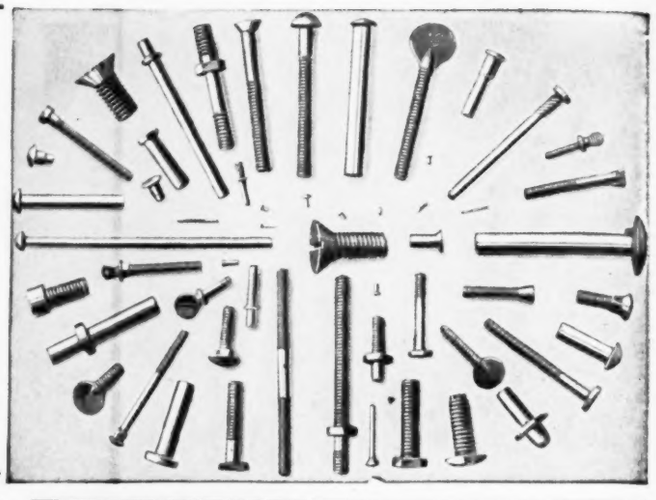

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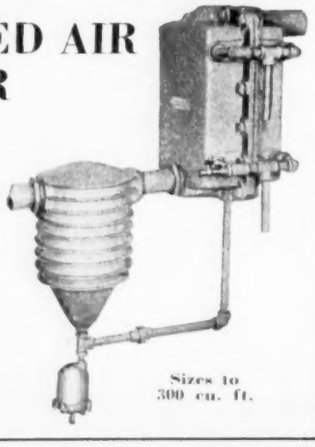

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Va., the company is expending about $3,500,000 in improvements.

RICHMOND, VA.—Board of supervisors, Henrico county, Henrico court house, Twenty-second and Main streets, will receive bids July 17 for sewage treatment plant, steel water storage tank, etc. R. Stuart Royer, 207 Builders Exchange building, Richmond, Va., consulting engineer.

Missouri

CLARENCE, MO.—City, W. H. Hudson, mayor, will receive bids July 12 for construction of sanitary sewer system, including sewage disposal plant, requiring resettling tank with pump unit. J. W. Shikles & Co., 108-09 New York Life building, Kansas City, Mo., engineer.

POPLAR BLUFF, MO.—City, W. A. Sanner, mayor, will soon call for bids for power plant improvement. W. A. Fuller Co., 2916 Shenandoah avenue, St. Louis, engineer.

ST. LOUIS—Missouri Hickory Handle Co. has been incorporated with $10,000 capital by B. K. Leach and John Fuhrer, 31 Rio Vista drive, to conduct woodworking plant.

ST. LOUIS — Gasconade Distillery Corp. has been incorporated with $27,000 capital by Louis C. Hehl and H. A. Woerman, Railway Exchange building, St. Louis.

ST. LOUIS—Anheuser-Busch Brewery, R. A. Huber, vice president, will expend $1,050,000 for new equipment and repairs, including ice machinery, boilers and turbines. Additional improvement is planned for 1935

Arkansas

FORT SMITH, ARK.—PWA approved application of city for $1,650,000 loan and grant for waterworks system.

MANSFIELD, ARK.—City has allotment of $56,000 for waterworks system, including pumping station, storage reservoir, distribution system, etc.

OSCEOLA, ARK.—City has loan and grant of $52,000 for installing an additional 850-horsepower diesel engine connected to a 625-kilovolt-ampere generator with necessary appurtenances.

STUTTGART, ARK.—City has allotment of $20,000 for constructing sewage disposal plant, pumping station and outfall sewer.

Wisconsin

EAU CLAIRE, WIS.—Wisconsin Steam Corp. has been incorporated by J. A. Playter, F. J. Wilcox and M. W. Ripley, to erect a central steam heating plant at Eau Claire.

MILWAUKEE.—Appleton-Atlas Car Mover Corp., Appleton, Wis., has leased space at 2947 North Thirtieth street, Milwaukee, for a branch assembling plant, warehouse, etc.

MILWAUKEE.—Gordon Metals Corp., Milwaukee, smelter and refiner of nonferrous metals, has purchased an industrial building at 4200 West Monarch place, and is taking immediate occupancy. Some new and modern equipment is being added to the present setup. S. Lacy Crolius is president.

RICE LAKE, WIS.—Sawmill of the Edward Hines Lumber Co. recently was destroyed by fire, including machinery, boilers and turbines.

Minnesota

LITCHFIELD, MINN.—Village council, Morten Mortenson recorder, will take bids until July 16 for a pump, motor and pumping equipment for a deep well, bids taken June 11 having been rejected. Charles Foster, 512 Sellwood building, Duluth, is engineer.

MOORHEAD, MINN.—Munn Sheet Metal Works, 303 First avenue, south, has awarded contract for construction of a 1-story sheet metal shop, 24 x 38 feet.

SOUTH ST. PAUL, MINN.—Cudahy Packing Co. has awarded contract to E. J. Dunnigan Inc., 1012 Builders' Exchange building, St. Paul, for construction of packing plant addition.

ST. CLOUD, MINN.—International Harvester Co., L. H. Hinz, branch manager, plans construction of branch warehouse and service building on East St. Germain street near the Great Northern railway tracks.

ST. PAUL.—Northern Pacific railway will start work at once on construction of an addition to its roundhouse at the Mississippi street yards. O. M. Rognan, 1228 Railroad building, St. Paul, is company architect.

WINONA, MINN.—City council, G. W. Hoffmann city clerk, will receive bids July 19 for a sewage disposal plant and collector sewer, to cost $270,000. Pearce, Greeley & Hansen, 6 North Michigan avenue, Chicago, are engineers.

WINONA, MINN.—Board of education, Adele H. Kressin, secretary, will receive bids until July 11 for erection of two-story elementary school, 157 x 246 feet, to cost $300,000, including two boilers, two stokers, and manual training and domestic science departments.

North Carolina

CASSELTON, N. DAK.—Great Northern railway, 175 East Fourth street, St. Paul, plans to rebuild coal docks destroyed by fire June 11.

Iowa

BURLINGTON, IOWA—John H. Witte & Sons Co., 207 Front street, has started construction of one-story, 60 x 100-foot, varnish manufacturing plant at Des Moines avenue and Cash street.

BURLINGTON, IOWA—Simplex Corp., has been formed by Michael Debrey, Walker D. Hanna, Roger Bowen and A. R. Kramer, to manufacture electrical equipment.

DONNELLSON, IOWA—Iowa state highway commission, F. R. White, Ames, Iowa, chief engineer, will build a 34 x 120-foot maintenance garage for storing and servicing road building machinery.

DUBUQUE, IOWA.—Dubuque Boat & Boiler Works has been awarded contracts by federal government for construction of three work boats equipped with diesel motors to cost $51,800, to be used principally on the Mississippi river in the vicinity of Memphis, Tenn.

WATERLOO, IOWA.—Corn Belt Mfg. Co. has been incorporated with capital of $30,000 to manufacture farm machinery, by E. H. Headford, A. F. Lukes and W. E. Robinson.

Nebraska

COLUMBUS, NEBR.—Loup River Public power district, C. B. Fricke, president, and Harold Kramer, secretary, have selected Harza Engineering Co., 20 North Wacker drive, Chicago, to prepare plans for proposed Columbus-Genoa-Loup river power canal projects, to cost about $7,300,000 including hydroelectric power plant and high tension transmission lines.

LINCOLN, NEBR.—Queen Incubator Co., Fourteenth avenue and Y street, is planning to rebuild its incubator manufacturing plant recently destroyed by fire.

SUTHERLAND, NEBR.—Platte Valley Public Power & Irrigation District, D. D. Price, Lincoln, Nebr., general manager, expects to let contract by Aug. 1 for construction of the proposed Sutherland irrigation and power project, to cost about $7,492,000, including diversion dam, reservoir, 45 miles of canals and hydroelectric plant. Parsons, Klapp, Brinkerhoff & Douglass, New York, engineers.

Montana

SACO, MONT.—Northern Power Co., 831 Second avenue, south, Minneapolis, Minn., C. W. Smith, chief engineer, plans construction of 35 x 70 foot compressor station, including installation of three compressors and water well cooling tower.

Pacific Coast

FRESNO, CALIF.—Sunland Sulphur Co., T. L. Harper president, is having plans made for additions to its plant, of steel and corrugated sheathing, to cost about $30,000.

ISLETON, CALIF.—Golden Gate Cannery Co. suffered loss estimated at $200,000 by destruction of its canning plant by fire.

OAKLAND, CALIF.—A company has been organized by Norman DeVaux to manufacture automobiles at the former East Oakland plant of the DeVaux-Hall Motor Corp.

SALINAS, CALIF.—Union high school district has had plans prepared for a 1-story automobile shop building to cost $6000, awaiting approval by the state bureau of education.

SAN DIEGO, CALIF.—Consolidated Aircraft Corp., Major Reuben Fleet president, has resumed preparation of plans for a manufacturing plant at Lindbergh Field, San Diego, after interruption last fall.

SAN FRANCISCO.—City will receive bids until August 20 for construction of a garbage incinerator with capacity of 800 tons daily.

SANTA ROSA, CALIF.—Sonoma Valley Brewing Corp. plans erection of three additional buildings, to cost about $100,000.

TORRANCE, CALIF.—Hughes-Mitchell Processes Inc., recently organized, is planning to build a $1,000,000 chemical plant for treatment of lead-zinc ores. W. H. Rose is president.

SEATTLE.—Silver Foam Brewery Co. will build a brewery plant at Fortieth street West and West Canal street, to cost about $100,000.

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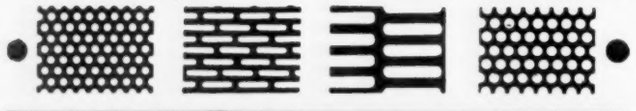

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